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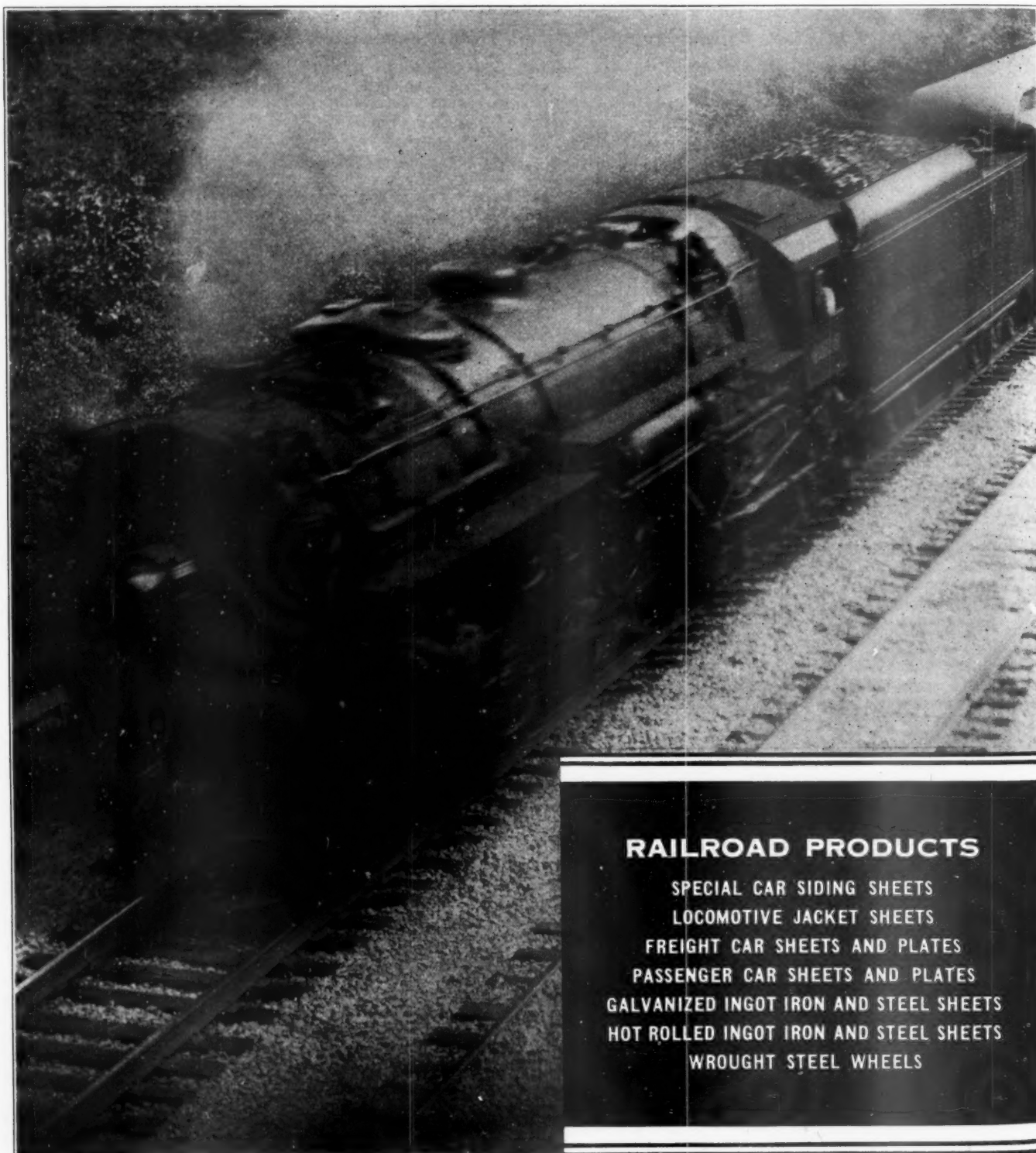
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# TAP THESE HIDDEN PROFITS IN YOUR ROLLING STOCK



## RAILROAD PRODUCTS

SPECIAL CAR SIDING SHEETS  
LOCOMOTIVE JACKET SHEETS  
FREIGHT CAR SHEETS AND PLATES  
PASSENGER CAR SHEETS AND PLATES  
GALVANIZED INGOT IRON AND STEEL SHEETS  
HOT ROLLED INGOT IRON AND STEEL SHEETS  
WROUGHT STEEL WHEELS



## RAILWAY AGE

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# New York's Barge Canal—A Waterway Example

In 1931, despite the depression, the New York State Barge Canal System did the biggest "business" in its history as a modernized inland waterway. We say "business", because the barge canal is about as far from a real business concern as anything could possibly be, except, of course, the inland waterways constructed by the federal government. What the barge canal actually is, is a machine for extracting several millions of dollars each year from the hard-pressed taxpayers of New York state and presenting them to a number of companies and individuals—shippers—who are sufficiently alert to get all they can when a dole from the taxpayers is forthcoming.

### Whom Does Canal Benefit?

The principal commodity moved on the canal during the year was wheat, of which there were 1,113,776 tons. Who got the benefit of any savings in transportation charges which there may have been in this movement? The western farmers who produced it did not receive any more per bushel than they did for wheat which moved across New York state by rail, and if the price was reduced to consumers in Europe by the movement, then how could that fact advantage American citizens in general or the taxpayers of New York in particular?

Second in the list of canal commodities, in their order of importance, was oil, of which 889,476 tons were transported. This movement was largely by the big oil companies—among them Standard, Sun, Texas and Gulf. Then came the sugar refiners who "patronized" the canal with 303,973 tons of their products. And Henry Ford placed in service two new canal boats each able to handle 1,800 tons at 13 miles per hour. These boats operate between his River Rouge plant in Michigan and tidewater in New York harbor.

The barge canal since 1905 has cost the people of New York state upwards of \$150,000,000 in capital investment. If the canal costs prior to 1905, the cost of operation since the modernization program was completed in 1918, interest payments on the outstanding canal bonds since their issue, and the cost

of terminals are added, the total net cost of the canal to the people of New York state is shown to be well over \$300,000,000, and this makes no allowance whatever for the money lost to the state in taxes by the diversion of this sum from tax-paying private industries to one which is publicly-owned and tax exempt.

However, to be more than fair, let us disregard all expenditures prior to 1905 and all accumulations of interest and operating expenses since then, and assume the barge canal to represent a present-day investment of only \$150,000,000 (approximately the total of outstanding canal bonds), costing the taxpayers, in interest at 4 per cent, \$6,000,000 a year. This is not a theoretical charge but an actual out-of-pocket cost to the taxpayers. Add to this the \$3,460,799 in actual operating and maintenance expenses and \$3,593,905 for additional construction during the year, and it is clear that the total cost of the canal to the taxpayers in 1931, calculated on the most conservative basis, was not less than \$13,000,000.

### A Subsidy of \$3.80 a Ton

The total tonnage moved through the canal in 1931 was 3,722,012, which, divided into the cost to the indulgent taxpayers, discloses a subsidy to the tune of about \$3.80 a ton. In 1929 the average haul on the system was approximately 250 miles. Assuming it to have been the same last year, the taxpayers of New York paid 1.52 cents for every ton-mile of freight moved on the canal. The average charge on the New York Central, which the barge canal system largely parallels, was approximately one cent per ton-mile. If it is just and expedient that the people of New York state should pay the freight bills of Mr. Ford, the large oil companies and other shippers who are willing to avail themselves of such charity, then they could have diverted the entire canal tonnage to railways, paid the entire railway rate, thus relieving the shippers of paying anything whatever, and at the same time saved the taxpayers of New York state one-half cent per ton mile, or one-third of the total cost of transportation by canal.

It may be argued that the investment in the canal system is water over the dam, and, hence, that it is unfair to include interest on this investment as a cost in estimating the savings which could be made by diverting the canal traffic to the railways. This argument might have some validity if the canal's protagonists would actually admit that the money invested so far was wasted and that future doles to shippers, if any, should be provided by the demonstrably more economical method of paying a share of their railroad freight bills. The canal protagonists make no such admission, however, as is proved by the capital expenditures constantly being made on the existing system and their propaganda favoring the conversion of a part of the system into a ship canal to accommodate ocean vessels.

But, to ignore any theoretical considerations whatsoever, and strip the problem down to its present, practical fundamentals as a taxpayers' problem: Should not the users of the canal be called upon to pay for the privilege of using it, at least that sum which the taxpayers would save now if operation of the canal were abandoned? Operating and maintenance expenses in 1931 were \$3,460,799 and \$3,593,905 was spent for additions and betterments. These latter, presumably, could be reduced to a very small sum, and perhaps eliminated entirely, but the operating and maintenance expenses would still remain as long as the canal system was kept open. The sum of \$3,460,799, therefore, if operation of the canal were abandoned, could immediately be saved the taxpayers or diverted to persons who need a dole far more than do the users of the canal. Why not, then, call upon these users for tolls to yield this minimum sum? Even with such a toll the state would still be offering them free of interest and tax payments the use of a facility representing a thoroughly written-down investment of not less than \$150,000,000.

#### • More Costly Than Rail Transportation

The state operates a large system of parks for the benefit of its millions of citizens, but these are made at least partly self-supporting by the leasing of concessions and direct charges for parking and bath-house facilities. If there is logic and justice in exacting a nominal charge for state-provided recreational facilities open to all, are there not even more cogent reasons for exacting similar charges for commercial facilities which are open, practically speaking, only to a few—and the richest and most powerful few at that?

While the taxes per ton-mile paid by the people of New York state to enable large shippers to divert their traffic from the railways and get it handled by canal at less than cost are relatively larger than the taxes per ton-mile paid by the American people to enable shippers to get their freight handled on other inland waterways at less than cost, the principle involved is the same. Why should the public be taxed 6½ mills per ton-mile to enable shippers to ship at an average rate of 6 mills per ton-mile on

the Ohio river system—a total cost of 12½ mills—when they can ship for 9 mills per ton-mile on the railways in the same territory, or for almost 30 per cent less than the total cost by water?

#### Governmental Extravagance Cause of Depression

Present economic conditions in this country, it is now generally recognized, are largely due to past and present gigantic waste of the money of the taxpayers. Workingmen, farmers and business men are holding mass meetings all over the country to demand reductions of taxes and of the government expenditures that make them necessary. Included in these wantonly wasteful government expenditures which cause present high taxes are the expenditures that have been made upon the Ohio river to enable freight to be moved on it at a total cost 30 per cent higher than it can be moved by rail and upon the New York barge canal to enable freight to be moved on it at a total cost 50 per cent or more higher than it can be moved by rail. And now there is a bill pending in Congress to provide \$500,000,000 more to waste on inland waterways, to divert more traffic from the railways and to further increase the amount of freight moved at an unnecessarily high cost, because, as is hoped, the suffering public can be deluded into taxing itself still more to provide doles for big shippers.

It is a national disgrace that there can be found, at a time such as this, business men who combine hypocrisy, economic illiteracy and selfishness in such proportions that they can loudly demand reductions of government expenditures and denounce doles for the unemployed, while advocating increased government expenditures upon waterways solely for the purpose of getting doles for themselves at the cost of the overburdened taxpayers.

## The Basis of a Motive-Power Policy

The need for a constant increase in the number and aggregate capacity of locomotives on American railroads has ceased. The need for a constant accession of modern motive power was never greater.

In the days when growing traffic demanded more locomotives, the motive-power problem presented itself in the simplest of terms. There was but one alternative to the immediate purchase of the new locomotives when they were needed and that was an almost equally immediate loss of gross revenue. No policy, in the sense of a plan contemplating future consequences, was required. Depreciation was considered a subject for academic discussion and the rate selected for accounting purposes was not visualized in any vital relationship to the probable useful life of the locomotive units. Depreciation rates were generally too low. As a result, the railroads are

today burdened with thousands of locomotives which have outlived their usefulness. Their continued possession constitutes a menace to the vitality of railway transportation.

In an article which appeared in last week's issue, Robert S. Binkerd suggests twenty years as a life beyond which the economic value of a locomotive is questionable. The developments which have taken place during the past twenty years, both in locomotive design and in railway operation, suggest that this estimate is conservative. During the past five or six years many locomotives less than twenty years of age have been replaced by modern motive power with operating economies which return the investment in from four to ten years. Future improvements in motive power and changes in operation will provide similar opportunities ten, fifteen and twenty years hence.

If the motive power which is modern today is not to become a future burden, as the motive power purchased twenty to thirty years ago has become a burden now, a policy of retirement at the end of a predetermined life must be established and carried out. The effect of the lack of such a policy can not be measured alone by the number of locomotives which have exceeded their predetermined life. The inability to add new and modern locomotives without an excessive building-up of the total investment leaves nothing to offset the cumulative effect of the varying degrees of obsolescence which are present in such an inventory from the top to the bottom. Where, for instance, the most modern locomotives owned are six or eight years old they have already become obsolete for at least some of the service which they must perform.

A policy based on the retirement of locomotives at the end of a predetermined period, representing not more than their economic usefulness, fixes a depreciation rate which, instead of a mere matter of bookkeeping, becomes a vital factor in conserving the future integrity of the railroad property. That low depreciation rates have in effect proved a menace to the value of the investment is evident in the number of requests which have been made of the Interstate Commerce Commission in recent years for permission to use the profit and loss account instead of the operating-expense retirement accounts in getting accumulations of obsolete equipment off the books.

A predetermined life—and adequate depreciation accounting—as a basis for a motive-power policy involves nothing new and is in itself simple. Its execution, however, is not without difficulty. This lies in the fact that at least some of the effects of the decisions made now are deferred so far in the future that it takes more than ordinary courage and vision to see them through. But with the object lesson of accumulated obsolescence, which is now presented as the result of the lack of a policy in the past, and with the growing number of examples of big returns which investments in modern motive

power are earning, the adoption of such a policy has now become as much a matter of immediate, as of future concern.

## How Employees Can Aid Railroad Cause

The spontaneous organization of "ship by rail" clubs by railway employees in so many different places throughout the country is proof positive of a spirit among them which, properly expressed, offers one very important means by which the railway situation may be improved and which it would be downright tragedy to overlook. How best promote such activity by employees to the end that it may be most effective?

We believe that the answer lies in encouraging employees, where they manifest a fighting spirit in the defense of their industry and their jobs, to form a local association to advance the cause and to establish contact with similar groups in other communities with the view eventually of establishing a state or even national federation of such organizations.

This procedure has already been followed in more than half a dozen states—and with surprisingly gratifying results. Groups which organize in this manner learn from each other's mistakes and soon develop into highly effective bodies, which isolated local clubs cannot hope to be. They soon learn to do more than solicit freight, and become a powerful educational force in behalf of the railroads in their communities, drawing recruits from persons in all walks of life.

It is no secret that the Virginia and Kentucky railway employees' associations played a very effective part in educating public opinion to bring about more adequate truck regulation and taxation in those states. In Ohio, Virginia and Georgia the employees' associations are doing good work in securing enforcement of existing motor vehicle laws, the violation of which enables trucks to handle traffic which they could not otherwise move. The Virginia association issues a newspaper which is distributed widely and which would do credit to a professional publicity organization. These are but a few instances of scores which could be cited of the value and effectiveness of these associations.

What railway employees can do in Virginia and Ohio and in the several other states where they are similarly organized, they can also do in your state. We have followed this movement closely and have a great deal of information about it which we will gladly make available on request to any interested railroad man. We can also put inquirers in touch with officers of the several state associations, all of whom are prepared to advise others who may be interested. Why not get this information, and plan now an organization in your community?



# Railroad Livestock Traffic Dwindles

Motor trucks gaining in competitive struggle—Need for strong measures emphasized—Wabash "any quantity" rate looks promising

By C. H. Hitchborn

Editor, St. Louis Daily Livestock Reporter

**T**HAT the equivalent of 300,000 carloads of livestock, or 31.39 per cent of the total receipts, was trucked into the 15 principal terminal markets of the vast livestock-producing agricultural area of the Middle West in 1931, is a matter of more than passing interest to officers of the railway systems serving this area and the markets concerned. Livestock trucked in to terminal markets pays no revenue to the railroads for the handling from farm to market, and the back haul which is an inevitable corollary of livestock trucking tends to reduce rail revenues still more. This is the growing menace to the business of the railroads in handling livestock from farm to market. That no successful plan has yet been devised and put into general operation is evident from the records of livestock truck-ins going to the terminal markets. Year by year the numbers mount and the truck-in percentage of total receipts grows larger. The increases are enormous and the gains made from year to year are not realized by most persons.

## Development and Persistence of the Problem

A compilation of statistics on truck-ins at markets, made by the Bureau of Agricultural Economics of the United States Department of Agriculture under date of February, 1932, gives definite information on the development of truck-ins at 16 markets for the past 16 years. Data are presented from the 15 markets of the Middle West area and for that at Portland, Ore. The eloquent figures in Tables I and II are taken from these data.

In 1921, the receipts of livestock at the 16 markets were 58,071,472 head, of which 3,397,675, or 5.21 per cent, were truck-ins. In 1931, the receipts at the same markets were 63,023,713, of which 19,784,423, or 31.39 per cent, were truck-ins.

In the several classes of livestock, during the 10 years, truck-ins increased in percentage of total receipts each year as follows: Cattle, from 2.44 per cent in 1921 to 24.03 per cent in 1931; calves, from 8.83 per cent to 44.91 per cent; hogs, from 7.71 per cent to 42.98 per cent; sheep, from 4.14 per cent to 17.01 per cent.

The growth of drive-ins, or truck-ins as they are more properly called at this time, comes as a natural development in the progress of the livestock industry with the increasing mileage of good roads and the larger number of larger and better trucks. It comes from the insistent desire of farmers for convenient, practicable

Table II—Ten Year Increase in Truck-ins

Truck-Ins	1921		1931	
	Head	Cars	Head	Cars
Cattle	271,694	9,346	2,542,037	90,785
Calves	297,646	4,960	1,560,609	26,010
Hogs	2,212,635	29,500	12,166,957	162,226
Sheep	615,700	4,100	3,514,820	23,432
Totals	3,397,675	47,906	19,784,423	302,453
Increase in 10 years			16,386,748	254,547

and not too expensive transportation to get their livestock to market. It will persist in its growth so long as the railways are unable to establish conveniences of transportation for the farmer's livestock comparable to the convenience and flexibility of transportation from farm to market by truck.

With the radius of the trucking zone about a terminal market stretching out to 200 miles, it is easily shown that practically every farm in the livestock producing area is within trucking distance of a terminal market. Two-hundred mile zones with centers at the 15 terminal markets mentioned in this discussion overlap one another in many sections and leave very few areas outside their boundaries. With specialization increasing in the growing of livestock for market and the tendency to sell in smaller numbers, the truckman finds a fertile field for developing a livestock trucking business. The truckman is contributing to the interests of the livestock farmer and to those of the central markets. To meet such competition, the railroads will find it necessary to devise an equally convenient and attractive plan of handling livestock from farm to market.

## Rise of the Terminal Markets

The terminal livestock markets of this country grew out of the needs of the livestock industry and the shift-

Table I—Cattle Moved to Market by Truck in 1931

	All Species	Cattle	Calves	Hogs	Sheep	Per cent Total Receipts
1. Omaha	3,180,198	494,113	48,398	2,048,165	589,522	36.45
2. Sioux City	2,947,595	385,624	29,224	2,164,469	368,278	61.72
3. St. Paul	2,243,439	240,997	360,003	1,361,849	280,590	35.30
4. Indianapolis	1,905,617	137,639	138,655	1,368,800	260,523	83.13
5. E. St. Louis	1,797,524	189,762	184,924	1,165,056	257,782	37.43
6. St. Joseph	1,633,905	137,137	58,928	1,056,240	381,600	48.02
7. Kansas City	1,277,842	185,649	102,752	689,029	300,412	23.07
8. Chicago	1,105,084	182,295	70,175	682,675	169,939	7.24
9. Cincinnati	857,962	52,199	81,881	504,268	219,614	45.57
10. Milwaukee	494,794	68,969	201,208	188,118	34,499	35.49
11. Ft. Worth	457,822	134,632	86,642	75,949	160,599	20.52
12. Wichita	437,746	97,375	37,471	258,883	64,017	51.15
13. Oklahoma City	434,101	107,471	57,606	214,286	54,738	66.87
14. Denver	420,584	70,353	27,437	237,479	85,315	11.68
15. Louisville	395,613	39,566	68,521	86,887	158,639	58.82
16. Portland	216,597	18,256	4,784	64,804	128,753	35.20
Equivalent in Carloads	19,784,423	2,542,037	1,560,609	12,166,957	3,514,820	31.39
	302,453	90,785	26,010	162,226	23,432	

ing of consumer populations in the latter half of the nineteenth century, and their development was dependent on the building of the railroads and the establishment of railroad centers at points strategic for meeting the transportation requirements of the producers and the consumers. The 15 market centers under discussion have a combined population of more than 8,500,000 persons, according to the census of 1930. They have rail service to the thousands of shipping stations in the livestock producing areas; they likewise have rail outlets to all the largely populated consuming centers of the East.

In the days of the drovers, livestock was driven on foot to the consuming centers, weeks and months being consumed in the long journeys to market. Next came the rise of the "country" packing plants, where butchers slaughtered for the local trade in fresh meats and packed the surplus for shipping to consuming centers. As the railroads pushed farther west and centers of population grew about their terminals, packing plants grew up at the terminals, and with them came the terminal stockyards, or markets. The "country" packing plants were absorbed by the large packers and the livestock industry was committed to the terminal marketing system. It adjusted itself to this system and carried on its development undisturbed until the rise of decentralizing influences following the World War. Let us take note of these disturbing influences with their tendency to divert livestock marketing business from the terminal markets.

Grievances of farmers over prices for livestock and the alleged unfair margins demanded by local buyers brought about the rise of co-operative shipping associations, by means of which the farmers were able to have their livestock assembled and shipped to the terminal markets where they might have the advantages of competitive bidding by terminal packers' buyers and order buyers. Then came direct buying and the packers' concentration yards in hog-producing territory.

Now the farmers have again become aroused over the low prices of hogs and, believing that direct buying and the concentration yards are largely responsible, they have listened to the proposition of organization leaders to set up farmers' co-operative concentration yards in the country. This is the latest development in devices for marketing livestock.

These new yards are putting forth every effort to get the lion's share of the truck-in business which, the figures compiled by the Bureau of Agricultural Economics show, finds its large terminus at the terminal livestock markets. The promoters of these country concentration yards have set themselves a task larger than they had anticipated. The farmers' products naturally seek the public markets, where consumer demand is established, in preference to way stations along the road to those markets. It has been shown that the urban centers at the 15 terminal markets of this discussion have a large consumer population. Truck-ins to these markets are going to continue to grow in numbers, no doubt, with the passing of the years and the probable failure of the country concentration yards to check their growth. When the farmer once turns his livestock over to the truckman, he is more than likely to order him to deliver it at the terminal market. Whatever device the railroad may inaugurate to meet truck competition must have the features of convenience and lower cost from farm to market, and must deliver the livestock at the terminal market in preference to any other destination.

#### Efforts to Solve the Truck-In Problem

It cannot be said that railroad officers have been inattentive to the truck-in problem that confronts them. On the contrary, they have been awake to its importance

and have tried a number of plans to meet the situation. Among these may be mentioned (1) permitting lower minimum weights per carload; (2) permission to load a car at more than one point without extra charge; (3) running of route cars from certain points on certain days to pick up whatever livestock or crated poultry may be offered for transportation to market at the regular carload rate; (4) running gasoline-powered cars on their lines to handle livestock at points where no regular service is available or where it is too expensive to stop a through train for a pick-up; (5) a combination truck-rail rate to cover transportation of livestock from the farm to the railroad station by truck and thence by rail to market. It is evident that none of these plans has met the situation effectively; the truck-ins keep increasing.

Many of the railroads now are encouraging country concentration yards, but it must be evident that such a system is a mere throwback to the days when the packers of the country thought they could take their plants to the crossroads. The history of that program, and its failure as it gave place to the terminal system of packing and marketing, is a fair prophecy of what will in time befall the ill-advised system of country buying and country concentration yards.

The most recent plan for meeting the truck-in problem of the railroads is the "any quantity" freight rate plan now being experimented with in a small way in a very limited territory on the Wabash. In the few weeks of operation under these schedules, it has been demonstrated quite conclusively that the "any quantity" plan is feasible and that it meets with favor among the farmers to whom its privileges and advantages have been made available.

#### The "Any Quantity" Plan

The "any quantity" plan of the Wabash has commanded wide attention. Representatives of a number of railway systems have come to National Stock Yards, Ill., to get first hand information about its details and to observe for themselves the results obtained in the delivery of livestock at market. The details of the plan are contained in the Wabash announcement which was published under date of February 29, 1932, as follows:

The Wabash Railroad announces that it has arranged for cars to be placed every Tuesday until further notice at several stations in Hancock and Adams counties, Ill., for the purpose of picking up "any quantity" of livestock that may be offered for shipping to the St. Louis market, National Stock Yards, Ill. The local railway station agent will receive the livestock, supervise the marking for identification, and accept it for shipping. The freight rate on any quantity from a single animal to a carload will be the regular carload rate from the shipping point to the National Stock Yards. The "any quantity" rate will apply only on Tuesdays. The rates are effective Tuesday, March 8, and every Tuesday following.

The arrangement is in effect at only six stations in Illinois as yet; namely, Denver, Ill., Bowen, Chatton, Golden, Blacks and Clayton. The distances from these stations to National Stock Yards range from 233 to 253 miles. Actual loading of cars takes place at only four of these points—Denver, Bowen, Chatton and Clayton. Livestock from the surrounding territory is brought in to these stations. While cars are placed for loading at each of the four stations named, stock received at two or more stations may be consolidated when necessary to make full carloads. Animals of different kinds are separated, this being accomplished by the use of partitions which are furnished by the railway.

The time in transit from the originating stations to National Stock Yards is approximately 24 hrs. Loading is completed during the morning on Tuesdays, and the cars are handled on regular freight schedules which



bring them to their destination early the following morning.

The Wabash "any quantity" rates to National Stock Yards, Ill., on one head or more of livestock are as follows:

From	Hogs	Cattle	Sheep
Denver, Ill. ....	\$0.25½	\$0.22	\$0.32
Bowen, Ill. ....	0.25½	0.22	0.32
Chatton, Ill. ....	0.25½	0.22	0.32
Golden, Ill. ....	0.25	0.20½	0.30
Blacks, Ill. ....	0.25	0.20½	0.30
Clayton, Ill. ....	0.25	0.20	0.30

Officers of the railroad state that the results so far obtained have not been satisfactory, though they admit that the plan has resulted in the return to the railroad of some of the business which formerly moved by truck. It is their view that the experiment has not been tried long enough as yet to constitute a fair test.

#### Results Surprisingly Favorable

It is rather surprising, however, that the results have been as good as they have been, considering that the plan is operating in so restricted an area, at so inauspicious a season in hog marketing, with unfavorable weather conditions, and with strongest competition from direct buying and country concentration yard interest.

On the first eight shipping days after March 8, when the "any quantity" rates were put into effect, there were 188 lots of livestock shipped under the "any quantity" rate in 25 cars. One hundred thirty-eight individual farmers took advantage of the rates to ship livestock to the St. Louis market. Thirty-three of these men were repeaters, 19 having shipped 2 times, 12 having shipped 3 times, one 4 times and one 5 times. There has been no confusion of livestock at the market, and no claims of any kind whatever have been made against either the railroad or the agencies at the market. The Wabash experiment has demonstrated beyond question that the farmer will accept such a service as is offered in the "any quantity" rate plan and that he will go readily and regularly to the railroad with his livestock. In only two instances, in the 188 shipments referred to, did farmers hire truckmen to take their livestock to the railroad station. The experiment has demonstrated, also, that the physical handling of the livestock by marking according to the marking charts, in use for a number of years, is practical and attended with no difficulty.

Those who have observed the operation of the plan since March 8 consider it easily the most significant movement yet made by the railroads to meet the modern conditions of livestock marketing. It seems to hold more possibilities than any other plan that has been devised up to this time. It meets the situation which requires the movement of small numbers of livestock from farm to market as the animals reach market condition, and does it without adding extra transportation costs or expensive home charges for assembling carload lots. It provides the same convenience and flexibility of movement to market which the farmers find in the trucking service. It offers a lower cost to get livestock to the terminal market, where it is evident that many farmers desire it to go, even at added cost, as the mounting number of truck-ins from year to year testifies. In this connection, it should be noted that whatever the railroads may do toward the encouragement of country buying or the assembling of livestock at country stock yards, as the data show, does not interfere with the growth of truck transportation to the price-making centers. The farmers realize that the hogs bought in the country are paid for on the basis of price levels established at the terminal markets. They are finding

out, too, that every possible transportation charge and marketing expense that would be incurred by going to the terminal market is taken into consideration before the price they get at home is made.

The "any quantity" rate plan, with all that the Wabash experiment has demonstrated in its favor, deserves a more general test under more favorable conditions than those which have obtained. It has already been demonstrated that it is convenient, practical and in popular favor among the farmers who have had the opportunity again to use the railroad. The truck has broken down the carload as a unit. The railroads failed to meet that condition until this Wabash experiment was tried. The added fact that, in applying the "any quantity" plan, the railroads are relieved of any additional investments in physical facilities, is a strong recommendation for further experiments.

## Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading continued its decline in the week ended June 11, amounting to 501,760 cars. This was an increase of 54,373 cars as compared with the preceding week, which included a holiday but was 19,202 cars less than the loading in the week preceding the holiday. It was also a decrease of 230,649 cars as compared with the corresponding week of last year and of 424,306 cars as compared with 1930. Loading in all the commodity classifications showed decreases as compared with the week of May 28, except miscellaneous freight which showed a small increase. In previous years there has generally been a slump in loadings during the first part of June before the beginning of the seasonal upturn accompanying the start of the grain movement. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

#### Revenue Freight Car Loading

Districts	Week Ended Saturday, June 11, 1932		
	1932	1931	1930
Eastern .....	114,842	161,801	208,076
Allegheny .....	96,411	146,356	191,002
Pocahontas .....	29,983	44,948	52,151
Southern .....	75,901	110,410	125,073
Northwestern .....	61,250	101,548	149,137
Central Western .....	78,978	106,062	128,335
Southwestern .....	44,395	61,284	72,292
Total Western Districts .....	184,623	268,894	349,764
Total All Roads .....	501,760	732,409	926,066
Commodities .....			
Grain and Grain Products .....	24,623	30,959	38,975
Live Stock .....	15,212	18,101	20,627
Coal .....	66,833	106,410	135,118
Coke .....	2,647	5,462	9,382
Forest Products .....	17,074	30,546	50,070
Ore .....	3,141	27,614	62,433
Misc. L.C.L. .....	176,681	218,716	243,045
Miscellaneous .....	195,549	294,601	366,416
June 11 .....	501,760	732,409	926,066
June 4 .....	447,387	761,084	935,582
May 28 .....	520,962	711,249	860,064
May 21 .....	515,450	754,738	929,606
May 14 .....	517,667	747,057	928,759
Cumulative total, 23 weeks .....	12,605,663	16,854,398	20,567,486

The freight car surplus for the last half of May averaged 750,574 cars, an increase of 18,782 cars as compared with the first half of the month. This included 380,527 box cars, 296,569 coal cars, 31,221 stock cars, and 14,566 refrigerator cars.

#### Car Loading in Canada

Car loadings in Canada for the week ended June 11 amounted to 43,686 cars, which was an increase over  
(Continued on page 1061)



# Why High Stresses Occur in Rails\*

Investigation shows wide variations in the loads carried by individual ties in what is considered high-grade track

By Dr. A. N. Talbot†

Professor Emeritus, University of Illinois, Urbana, Ill.

IN THE tests of track made by the Committee on Stresses in Track, measurements have been made of stresses in rail. The purpose of these measurements was not alone to learn how large the rail stresses are. An important purpose has been to obtain data from which a study of track conditions and track properties may be made; to learn where there are defects in track and to suggest improvements that may be made; to find under what conditions good track qualities are obtained and when poorer results are found—in fact, to find the characteristics of the action of track of different kinds. In these track tests I have frequently been struck with the variability of most track from point to point along a given stretch under not very widely varying conditions. I am referring to what would usually be called good track—heavy, high-grade track, not track that is considered to be in poor condition.

In Fig. 1 are shown the stresses in the base of 130-lb. rail, measured at every second tie and given in terms of the average stress all along the two rails as unity. The tie spacing averaged about 21 in. The ballast was hard broken stone of excellent quality to a depth of perhaps 20 in. or more below the ties, and the bed would be called very stiff. New rail and new tie plates had been laid six months before the tests, a moderate amount of track surfacing had been done one or two months before, and the traffic over it was of the heaviest. The stresses in the base of rail were measured at every second tie, and the locations were chosen at random. Two of the several locations are shown in the figure. The ordinates of the points on the two light lines give the stresses at the two edges of the base of rail, measured in terms of average stress along the track as unity, the full line representing the stress at the outer edge of the rail and the dotted line the stress at the inner edge.

The differences shown in the stresses in the two edges of the base of rail and the changes in position of maximum stress indicate a constantly changing lateral bending, sometimes one way and sometimes the other, and also a marked twisting in the rail. It should be noted that these measurements were made by moving the load from point to point along the track and always measuring the stress in the rail directly under the rear wheel, with almost identical vertical and lateral loads at every spot. Remember, it is not a question whether the rail is strong enough to take these twisting and lateral bending stresses but rather that the tests show extreme variability in the action of the track and a crazy distribution of the forces along the track.

The heavy line of the diagram in Fig. 1 shows the average or mean stress in the base of rail and may be considered as representative of the vertical bending mo-

ment developed in the rail from point to point. It will be seen that these mean stresses vary greatly from point to point along the track, being as much as 1.6 times the average stress along the track and at another place not far away only 0.3 of the average stress.

## Variations in Tie Reactions

Pull-up and push-down tests were made on some of the same stretches of this track. In the pull-up test a bar is placed under the tie at its end to lift it by man power until the tie plate comes in contact with the base of the rail, and levels are taken to determine the amount of this lift at a point on the tie at or near the rail. The result measures the vertical play between rail and tie which is overcome when a wheel load is applied. Similarly, in the push-down test a bar is placed in such a way as to push the tie downward to reach the general position of its ballast bed, care being taken to pull the spikes slightly in the few cases where the rail may be holding the tie up; the result measures, in a way, the play between tie and its ballast bed.

Figure 2 shows samples of these tests. The ordinates in the diagram down to the fine line represent the play between the rail and the tie, as found by the pull-up test. There was a considerable range in this play, say between 0 and 0.15 in., and there was even one of 0.25 in. at a location not shown on the drawing. The distance between the fine line and the heavy line represents the play between the tie and its ballast bed; this is a smaller amount, say from 0 to 0.03 in. The distance from the base line to the points on the heavy line represents the sum of the pull-up and push-down measurements or the total play between rail and ballast bed. The values given in this figure range from 0 to 0.18 in.

It is not so much the amount the rail must depress before it will receive tie support, as the differences between the play at one tie and its neighbor, or between the play of a group of two or more ties and another group of two or more ties near at hand within the

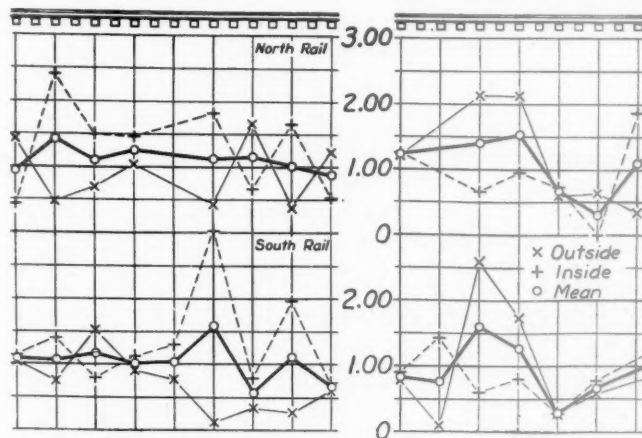


Fig. 1. Variability in Rail Stresses for the Same Wheel Loads

\* From a lecture given at the convention of the American Railway Engineering Association. The portion of his remarks dealing with Rail Joints was abstracted in the issue of May 7.

† Director of the Joint Rail Investigation and Chairman of the Special Committee on Stresses in Track.

length of a wheel truck or of two wheel trucks of adjoining coupled cars. The groups of these tie reactions, by their wide variation, will give far different loading effects upon the rail and therefore a wide range in the bending moment developed and in the resulting stress in the rail from point to point along the track.

### An Example

In Fig. 3 are examples of variations in individual tie loads based on these tests. The pull-up and push-down

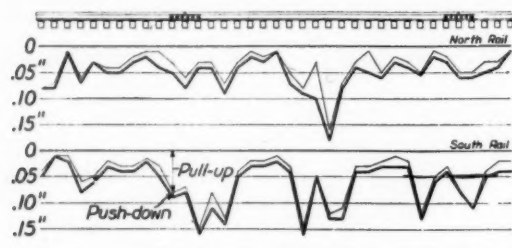


Fig. 2. Pull-up and Push-down Tests—Play Between Rail and Tie Bed

test values have been used to estimate the loads taken by individual ties by considering that a group of ties between and just outside of the wheels of the truck of a loaded freight car are depressed the same amount (and this is closely true with 130-lb. rail) and that the loads carried by individual ties are proportional to the net depression of the tie, the six ties carrying the full load. At least, this assumption is nearly enough correct for illustrative purposes. For this track and the medium load used in the tests (15,000 lb. per wheel) the average net depression for each of the six ties would be 0.07 in.—very stiff track. Four locations are shown in the illustration. The ordinates of the upper diagram in each group give the play between base of rail and tie ballast bed (sum of pull-up and push-down tests). The tie will not take load until the rail has been depressed an amount equal to this play; beyond that, it is assumed that the load taken by the tie is proportional to the further depression, namely, the net depression. On this basis, the loads taken by the indi-

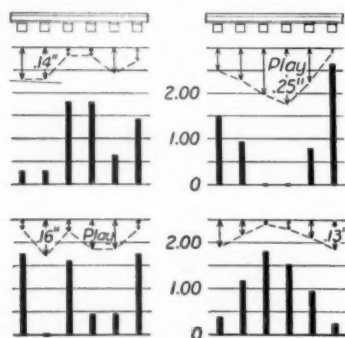


Fig. 3. Diagram of Possible Variations in Tie Loads

vidual ties are calculated to be the values shown by the heavy vertical lines—all measured in terms of the average load, which one tie should carry under normal assumptions, as unity.

These individual loads or reactions affect the value of the bending moments developed in the rail. With such variable supports, on diverse tie loads (tie reactions), the moments and stresses and tie loads from point to point, as the car moves along the track, must vary widely, and the rail, ties and ballast bed will be punished accordingly. The rail may be able to stand

the variable stresses without trouble (unless other conditions are unfavorable), but the substructure should not be compelled to bear the unnecessary burdens.

### The Cause

Now let us see what may cause much of the lateral twisting and bending in the rail. As I have examined track, I have found many tie plates that do not fit the tie and the top bearing faces of which are not in the same plane with the base of the rail. The planes of these bearing faces on adjacent ties may be off in opposite directions, and the bearing at the rail at one end of the tie may disagree with the bearing at the other end. The adzing for the tie plate is not regular and the plate may rock.

I am not speaking of poor track; and the heavier the rail and the stiffer the ballast bed the greater is the disturbing effect. This all means that the position of the resultant of the upward reaction of the tie and tie plate at one tie does not agree with the center of pressure of the next tie, and both may not be in the same plane with the wheel loads, and a resulting twist is produced by the forces, or a lateral bending is produced in the rail in other ways. Figure 4 is an attempt to picture conditions of bearings that produce eccentric loading, torsional effects, twisting of rail from tie to tie and lateral bending of rail. It is the upward force

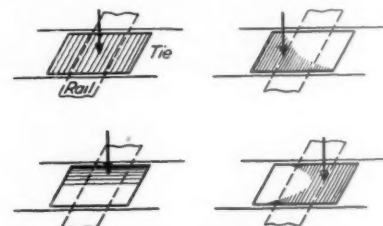


Fig. 4. Diagram Indicating Variations in the Positions of the Centroids of Tie-Plate Pressures

we are considering—not downward as shown by the illustration.

Doubtless most maintenance officers have observed the unevenness of bearings referred to but perhaps may not have appreciated fully the troublesome effects of defective adzing and imperfect bearings. One remedy, it may be said with confidence, lies in machine pre-ading and preboring of the ties and the application of the tie plates in the shop, where skillful and workmanlike methods may be used to ensure accurate fit and identical planes.

### Produces Torsional Effects

Referring again to Fig. 1, the variations in stresses at the two edges of the base of rail (shown by the light lines) are indicative of lateral bending and twisting of the rail, caused principally by the unevenness of bearing between rail and tie. The rail may not bear evenly on the tie plate, or the tie plate on the tie, or both. The other variability referred to, that of the mean stress in the base of the rail (shown by the heavy line), is due to unevenness of the tie support from point to point, as shown by measured variations in the play between rail and tie and between tie and ballast. It should be agreed that for high-grade track an effort should be made in maintenance to reduce these variable features to the smallest amount practicable.

The diagrams in Fig. 5 give data obtained on another track—also a high-grade track. The rail is lighter—110-lb. The track is well and deeply ballasted. The stretch shown on the left half of the diagram is sup-



ported on hard limestone, well compacted, and the track substructure is very stiff—the stiffest track we have tested. The stretch on the right half of the diagram has flint gravel ballast and is less stiff, though this track is above average stiffness. Note the stresses in the two edges of the base of rail (shown by the light lines). There is little crossing of these two lines—some lateral bending but generally in one direction—hardly any twisting. The mean stress in the base of the rail (shown by the heavy line) is also fairly uniform along the stretch.

One great difference between this track and that illustrated in Fig. 1 is that the ties in this track were pre-adzed and prebored and the tie plates were applied in the shop in a workmanlike manner with tie plates held firmly in the right place by screw spikes. Another feature of this track that contributes to the uniformity is the presence of a compressed wood shim immediately under the rail, though I am unable to say to what extent the shim contributes to this particular feature of track action. This track, of course, is GEO construction on which some test work was done to learn something of its characteristics, but in this matter of pre-adzing and preboring, the construction follows in several ways practice in use in this country for several years and which we tested some years ago.

#### More Attention to Details

Let me call attention again to the importance of attending to details in items other than the adoption of heavy rail and deep ballast for stiff, heavy high-grade track for heavy traffic. The stiffer rail spreads the load

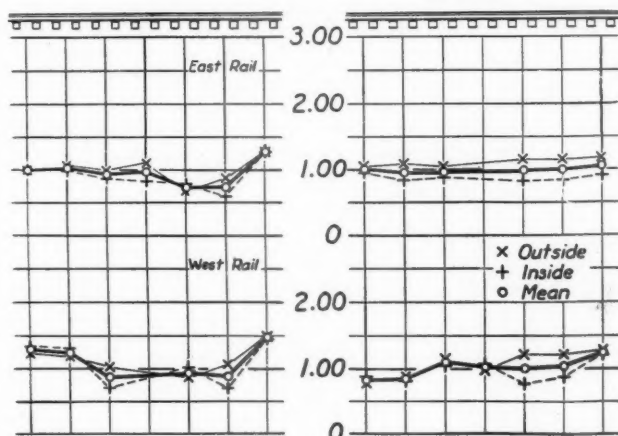


Fig. 5. Stresses in Rail with Ties Preadzed and Prebored

over more ties to some extent, but not very much farther for a group of wheels like drivers or car trucks. The stiffer ballast bed is now in general use. It follows that with this stiffer ballast bed the net depression of the rail under heavy loads is much smaller than with the lighter track substructure formerly in use. Some of the first track tested by the committee years ago gave a net depression under heavy loads of say 0.35 in. Some of the later tests with much stiffer substructure give only 0.07 in. for the same loads or one-fifth as much. However, the variability of the play between rail and tie in much track has not changed greatly.

The resulting variability in individual tie loads, for both light and stiff substructures is recorded in the table. Consider first that the play at alternate ties in both types of track is 0.07 in. and that the free rail rests only on every second tie, and that when loaded, the average net depression of all the ties is 0.35 in. for the light substructure and 0.07 for the stiff substructure,

and that the first tie (as we count along the track) takes load from the start and the second only after the rail has depressed 0.07 in., and so on. Then, on the assumption that the net tie depression is proportional to the load carried, the load on consecutive ties would be as given in the table for light and stiff construction, respectively. Although the distributions of loads shown in the table are calculated values, they tell how variability may happen. And bear in mind that these examples are not the worst cases that are to be found.

Thus it is evident that greater stiffness of rail and greater stiffness of ballast bed, without a corresponding improvement in track surfacing, contribute to the

#### Variability in Individual Tie Loads for Light and Stiff Substructures

	Light Substructure	Stiff Substructure
Average net depression for 25,000 lb. wheel load .....	0.35 in.	0.07 in.
Possible range of tie play .....	0 to 0.07 in.	0 to 0.07 in.
Range in individual tie load .....	90 to 11%	50 to 150%
Greater range of tie play .....	0 to 0.14 in.	0 to 0.14 in.
Range in individual tie load .....	80 to 120%	0 to 200%

Note: Alternate ties are considered to have the full play and the other half to have no play.

variability in moments and stresses and to variability in the distribution of the tie and ballast loads. All observations emphasize the need of great care in the substructure of stiff track.

One of the great needs is a method of tamping track uniformly, and further, a method of knowing when the tamping has been done uniformly. I have great admiration for the eye of the track foreman who brings the line and surface of the rail so accurately to position, but unfortunately he can not see under the rail, or under the tie plate, or under the tie or into the ballast, and can not gage the stiffness of the ballast as it varies from tie to tie. The idea that the track will be settled and pressed down into greater uniformity by the action of traffic may do for light, loose material, but with stiff ballast the hard spots become harder and the spots with looser material go down. Perfection is not possible, but the man who will devise a means for judging and regulating toward uniformity the stiffness of this substructure will do a great service for track maintenance. And the heavier the rail and the stiffer the substructure the greater the gain will be.

## Freight Car Loading

(Continued from page 1058)

the previous week's of 1,072 cars. Two factors affecting this increase were the holiday in the previous week, and the haste of the western farmers to deliver wheat to the elevators in time to collect the Dominion government bonus of 5 cents per bushel. The second factor was probably the more important as the increase in grain loading was 1,370 cars over the previous week's shipments and 1,009 cars over shipments during the twenty-third week last year. The index number was 70.19 as against 67.49 for the previous week and 71.05 for the twenty-first week.

Total for Canada	Total Cars Loaded	Total Cars Rec'd from Connections
June 11, 1932 .....	43,686	17,640
June 4, 1932 .....	42,614	16,239
May 28, 1932 .....	39,841	17,078
June 6, 1931 .....	49,979	23,549
Cumulative Totals for Canada		
June 11, 1932 .....	954,819	478,404
June 6, 1931 .....	1,104,243	643,927
June 7, 1930 .....	1,339,390	828,524



# Railway Supply Officers Hold Annual Convention



L. C. Thomson  
Chairman

Obsolete and inactive stocks,  
car-loading, scrap-handling  
costs and mounting stores ex-  
pense considered — New  
R. B. A. president heard



G. E. Scott  
Chairman-Elect

**P**ROBLEMS confronting the railroads in purchasing, storing, distributing and otherwise handling over \$45,000,000 of materials and supplies each month and the current problems of collecting and disposing of thousands of tons of scrap iron and protecting and controlling an investment of over \$350,000,000 in unapplied stocks during one of the most trying periods in railway history, received special attention on Wednesday and Thursday, June 22 and 23, when the Purchases and Stores Division of the American Railway Association held its thirteenth annual convention in Chicago. Approximately 300 railway officers and guests were in attendance at the opening session, when the association heard the first address of Harry A. Wheeler in his capacity as the new president of the Railway Business Association, as well as a greeting from the American Railway Association by M. J. Gormley, executive vice-president, and the annual address of the chairman of the division, L. C. Thomson, manager of stores of the Canadian National System.

The program also included reports from over 25 committees and several papers. The work of the division and the progress made by it during the 13 years since its organization in formulating recommended rules and practices of conducting purchases and stores work were reviewed in a paper by the secretary, W. J. Farrell, and a paper was also presented by L. L. Studer, district storekeeper on the Missouri Pacific, describing

this road's consolidation of 34 division and stores-accounting organizations into two bureaus.

In its report to the association, the General committee referred to the striking reductions which have been made in the inventories of unapplied materials on the railroads and attributed this reduction largely to the activities of the railway supply organizations, aided by the division. The General committee also announced the organization of a committee to arbitrate disputes arising between railroads and dealers incident to the sale of scrap iron. For the fourth consecutive year, the division conducted a contest among the supervisors and employees of railway purchasing and stores departments for papers on the work of the supply departments, and heard the two winners of the contest, William Courage, a trucker, and P. J. Hurley, an invoice clerk, read their papers.

G. E. Scott, purchasing agent of the Missouri-Kansas-Texas, and C. B. Tobey, general storekeeper of the Lehigh Valley, were elected chairman and vice-chairman, respectively, for the ensuing year.



W. J. Farrell  
Secretary

## M. J. Gormley Speaks

Mr. Gormley discussed the criticisms of railroads and various panaceas which have been proposed for the solution of the railroad problem, including the argument made for smaller cars. He defended the efficiency of the railroad machine against these criticisms and declared that the radical changes being suggested are the result of a failure of the public fully

to appreciate the improvements constantly being made in rail transportation. The man in the street, he said, does not know that the railroads have poured \$7,000,000,000 into their machine since 1923 for improvements and betterments that promote economy and efficiency of operation. He does not know of the vast amount of research that has been carried on by the railroads individually and collectively, augmented by the inventive genius of the railway supply industry. Reverting to the competition of motor vehicles, Mr. Gormley drew a parallel between the early regulation of the railroads and the present regulation of the highway truck, and declared that with the inception of federal regulation of highway transport, the iniquities in unregulated competition will largely be eliminated.

## Remarks of the Chairman

There never was a time when so much was expected from the purchasing and stores departments of the railroads, nor a more difficult period for the supply organizations to function, said Mr. Thomson, in opening the convention. Every effort is being made to substitute or utilize material on hand to avoid out-of-pocket expense. The deferring or abandonment of many work programs for which commitments were made for the materials have caused deliveries of material from manufacturers to be made for which there is no immediate need, and materials that were issued from stock have been turned back from jobs, making it difficult to reduce the investment in unapplied materials. Tremendous accumulations of scrap have also been made on many railroads because of there being little or no market for the scrap during the past few years, and this has contributed to swell the material balance at a time when it should be coming down, causing considerable concern in handling material with minimum expense. Because of the less rapid turnover of stock, stores expense has become a matter of concern, Mr. Thomson pointed out, and the problem is further complicated by the fact that with shops working shorter hours, with fewer trains operating and with reductions in forces, the stock records do not in all cases immediately reflect conditions required for effective control of materials.

## Mr. Wheeler's Address

The remarks of Harry A. Wheeler, President of the Railway Business Association, were in part as follows:

The Purchases and Stores Division of the American Railway Association represents to me a departure from old methods salutary in its influence upon both buyer and seller. Quality must be sustained in the presence of your uniformly drawn specifications and established tests, while the necessity of the seller to purchase the buyer's favor by other considerations than the merit of his offerings should have less chance to thrive with you than in those industries where such associated effort is impossible to achieve.

Notwithstanding, however, the advantage of associated effort there is always present the age-old striving for advantage between buyer and seller. It must require an exceedingly well-balanced temperament to recognize that low price is not always the best value and that experimental specifications that seem to meet the requirements with lower initial cost may not in practical effect produce the results sought nor insure the greatest safety where the commodities enter into high-speed operation. If in addition to the other admirable conditions developed by your associated effort you are able to maintain in your departments that fair and equitable balance in which price and quality and the right of the seller to a profit shall each have its full weight in your buying function, your organization will have accomplished a significant achievement that in my judgment will be far more important to your principals than the matter of cutting the last penny off the purchase price.

### Standardization

I find myself particularly interested in your effort toward standardization of materials and classification. While standardization in many lines has been carried to an extreme and in some industries does not well lend itself to the best development of the industry, I cannot conceive of a more fruitful subject in dealing with the purchases of America's railroads than a broad standardization of equipment and supplies. Moreover, I do not see how the railroads can operate with-

out it, for after all the railroad system of the country is and should be a unit of operation even though controlled by many separate corporate managements; and the highest degree of standardization in all of the materials and equipment that enter into railroad operation must simplify the complex problems which through operation impose upon every traffic unit.

Periods of depression are valuable in eliminating waste and extravagance that inevitably creep into business and private life when times are good. Periodical adjustments are imperative in all operating factors, including wages, and periods of depression seem to afford the only sure route to a new base point from which to begin again. Yet a long continued depression distorts the clear judgment and mental balance between worthwhile and wasteful expense cutting. Persistent retrenchment beyond the point of practical adjustments serves only to strangle the nation's recuperative power.

### "Somebody Must Do Something"

Since the fall of 1930 all advice and all action, both business and personal, has centered upon (1) curtailment of purchases, (2) retrenchment of expenditures, (3) liquidation of debts, and (4) restriction of credit. The whole program, proper enough within limitations, is entirely negative. Even the most superficial observation must convince us that the processes of contraction have continued unchecked in spite of all of the earnest effort put forth to reverse them. Of course, this contraction cannot go on without destroying both property and human values. We all agree that somebody must do something, but who and what?

Last Saturday when General Dawes returned to Chicago, he said to the press, out of his experience as retired president of the Reconstruction Finance Corporation, "The recovery in the depression will start from the bottom up \* \* \* \* For real evidences of reaction we must look to the mass attitude of our people and not to the shifting opinions of certain sections."

Here at last is the truth. Only in the hands of a hundred and twenty million people lies their salvation from complete economic breakdown. The present income of the American people, or if you take it more broadly, the national income, while greatly reduced, is still sufficient to turn the tide of this depression if concertedly and intelligently applied. Confidence has been shattered and faith is lacking. These two qualities must be restored and action based upon them must be used to reverse present trends.

### A Time for United Action

And why should not we consider this an appropriate time for united action? Are not promising constructive conditions in sight? Let me name a few:

Foremost among them is the corrective influence of time. The whole world is more ready today than ever before to face truth, abandon false hopes and ambitions, and to replace international diplomacy with the spirit of international co-operation. Witness the encouraging reports from Lausanne and Geneva. The foreign drive against the American dollar has lost its force. Gold shipments have decreased, our supply is ample and the gold standard is safe, at least for the present.

A reasonably balanced budget insures national solvency. A beginning of governmental economies with an aroused public sentiment for further action will be reflected in reduced taxes. Bank failures have decreased and greater mobility is evident in banking resources. The expected enlargement of powers and resources of the Reconstruction Finance Corporation is extremely hopeful. Commodity prices are lower than we had ever expected to see and present inventories are admittedly low. Finally, and with a feeling of thanksgiving, we are promised the early adjournment of Congress.

If these favorable indications are accepted as reasons for confidence and faith by the people in broadening their purchases and by business in preparation for better business, car loadings and earnings will reflect the upward trend and the depression will have entered a new and hopeful phase.

## Supplies for Motor Buses

J. L. Sullivan, Chairman\*

The committee report was directed exclusively to formulating a standard grouping of the supplies used in motor bus maintenance and operation, with particular reference to settling the controversy over the question of using the standard grouping of materials for general railroad use or establishing a separate grouping. The classification recommended in 1932

\* Division Storekeeper, Union Pacific.

was submitted to each committee member with instructions that they consult with motor bus companies in their locality, and the answers received from the majority of the committee members indicated that the motor bus companies were unanimous in their recommendations for its permanent adoption.

Material used in connection with motor bus operations, with few exceptions, is entirely foreign to that handled for the maintenance of rolling stock on steam railroads, and the committee decided that any attempt to assimilate the various items with the present classification used by the railroad would result in confusion.

The committee, therefore, recommended the adoption of a separate classification to consist of 16 classes as follows: (1) Fuel; (2) Lubricants; (3) Tires, Tubes and Rubber Goods; (4) Engine and Parts; (5) Power Transmission System; (6) Chassis; (7) Lighting and Ignition System; (8) Brakes; (9) Body Parts and Upholstering; (10) Tools and Equipment; (11) Paint, Painters' Supplies and Cleaning Material; (12) Bolts, Nuts, Rivets, Washers, etc.; (13) Bar Iron, Steel, Pipe, Metals, etc.; (14) Lumber; (15) Scrap; and (16) Obsolete Material Held for Disposition.

**Discussion.**—The recommendation in the report that a separate classification be provided for obsolete materials held for disposition was opposed by several members. C. B. Tobey (L. V.) explained that with the card system of stock books, obsolete material is not physically separated but disclosed by colored signals affixed to the cards, showing separately the obsolete material, surplus material and slow-moving material especially ordered. E. D. Toye (C. N.) said that on the Canadian National where the card system is also used, no physical separation is made, but obsolete material is set up in a suspense account. U. K. Hall (U. P.), among others, favored a separate classification for obsolete material so that the management could see the values, and the recommendation of the committee was upheld. H. H. Laughton (Sou.) stated that by requiring close attention to obsolete material by local officers, the Southern has little obsolete material at any time to write off.

## Scrap Handling and Reclamation

I. C. Bon, Chairman\*

The committee's report described facilities and equipment on several unidentified railroads for handling scrap and contained various performance data, portions of which are shown in Table A.

The report included data on reclaiming crank-case oil from automotive equipment by two processes, parts of this information being presented in Table B.

\* Superintendent of Reclamation, Wabash.

Table B—Reclaiming Crank-Case Oil

Road	Old Oil gal.	Crank Oil Reclaimed gal.	Other Oil Reclaimed gal.	Savings	Cost per gal
A .....	49,695	40,053	5,398	\$10,732	\$,0943
B .....	14,050	13,765	...	6,721	,0912
C .....	...	2,104	22,000	778	,0993
D .....	11,608	5,616	...	2,605	,136
E .....	39,000	23,400	...	8,655	,09
F .....	12,687	7,450	...	2,378	,12

The by-products from one of the processes is called penetrating oil and can be used for loosening bolts, washing parts, cleaning and lubricating springs, loosening rusts, etc., while the sediment recovered from filters can be used as a sweeping compound.

The report included data on car and locomotive journal box reclamation made to comply with the new A.R.A. rules governing journal box lubrication. The cost data are presented in part as follows:

Road	Pounds Reclaimed	Savings	Cost per 100 lb. Labor	Cost per 100 lb. All Chgs.
A .....	1,251,565	\$33,733	\$.422	\$.863
B .....	90,000	...	.34	.71
C .....	57,000	...	.50	1.00
D .....	...	...	..	.80

In 1927 the average number of miles per hot box was 53,274 as compared with 664,717 in 1931, an increase of 611,443 miles per failure. Over 80 per cent of the journal packing removed from boxes can be renovated and the oil reclaimed, while the residue can be used for locomotive front-end paint, lubricating track switches and fastenings, and as a center-plate and side-bearing lubricant.

### Scrap Classes and Terms

Recommendations made by the dealers effecting the terms of sale, and the important changes recommended in the classification of scrap were submitted to the member roads and favorable replies were received from the majority of 73 roads. The proposed revisions in scrap classifications included the recommendation (1) to segregate coupler yokes from scrap arch, transom and tie bars, (2) to create a separate classification for uncut arch bars of steel, (3) to prohibit the inclusion of short lengths with steel axles, (4) to create a separate classification for large steel castings, (5) to require compactness in steel scrap for melting, (6) to restrict the maximum length and width of steel plate for melting to 15 in., (7) to create a separate classification for coil and flat spring steel respectively, and (8) to eliminate car underframes as well as trucks from scrap car bodies.

Revisions proposed in the terms for selling scrap were as follows:

Awards will be made by mail within 48 hours from the time set for the closing of bids. All scrap reported for sale must be on basis of net tons. Cars must be light weighed uncoupled and free at both ends. Track-scale weights at point of loading will govern. Only variations of over 1,000 lb. will be investigated. Claims for shortages in weight or for any other cause must be presented within 30 days from date of shipment. Sellers must be given an opportunity to investigate the claim before the car is unloaded. All shipments will be made in not less than minimum carload lots unless otherwise specified in offering.

### Dismantling Locomotives and Cars

The report contained information covering the facilities and costs of several roads for dismantling locomotives and cars which are shown in part in the tables. Owing to the varied accounting methods, overhead expense was eliminated. It was difficult to arrive at any fair comparison of costs. Road B gave the cost of dismantling a 60,000-lb. capacity car with steel center sill, wood body and arch-bar trucks while

Table A—Cost of Handling Scrap

Road	Tons Ferrous Scrap Assorted and Prepared by Scrap Forces Including Recovered, Reclaimed and Manufactured Material		Tons Non Ferrous Scrap Assorted to Classification by Scrap Forces		Percentage Scrap Sold		Cost per Net Ton for Handling
					Mills	Dealers and Brokers	
A .....	22,995	795	...	...	20	100	\$.34
B .....	25,972	1,976	...	...	10	80	.62 covers labor and supervision of tonnage shipped excluding rail
C .....	9,890	776	...	...	...	90	.487 all expenses of operation and overhead charges, excepting interest and depreciation on plant, taxes and repairs to machinery.
D .....	178,628	3,141	...	...	29.5	70.5	.88 excluding handling by other than scrap dock forces.
Yard 1 .....	15,926	...	...	...	37.5	62.5	.10 loading.
Yard 2 .....	14,400	...	...	...	37.5	62.5	.50 unloading and sorting.
F .....	...	...	...	...	5.0	95.0	.40 to .50
G .....	11,154*	972	...	...	61.0	39.0	.4442
H .....	66,396	1,815	...	...	20	80	.501
I .....	40,371	475	...	...	0	100	Cannot furnish
J .....	...	...	...	...	4	96	.992 includes all labor, supervision, switching charges, miscellaneous materials, gases, outfits and repairs to equipment, crane, shears, etc. Does not include interest, depreciation and taxes.
K .....	26,555	540	...	...	0	100	1.40
L .....	248	248	...	...	90	10	2.40 includes unloading, sorting and reloading.
M .....	44,412	0	...	...	5	95	...
N .....	108,000	1,560	...	...	...	100	46.5 includes unloading, sorting and loading.
O .....	41,868	138	...	...	..	...	46.5

\* Does not include scrap from dismantled equipment.



Roads A and C gave the average costs of dismantling wooden cars and all-steel cars. Road A made no charge for preparing the scrap for sale and Road C included the prepara-

Cost of Dismantling Cars

	Road A Overhead and Locomotive Crane	Road B Locomotive Crane	Road C Locomotive Crane	Overhead Crane
Per cent mill or yard scrap ..	Yard	60 mill	86 mill	86 mill
Per cent good material ....	50	Not available	23	23
Includes cost removing good material .....	Yes	Yes	Yes	Yes
Includes inspecting and shipping .....	Yes	No	Yes	Yes
Average cost per unit .....	\$43.65 Steel cars	\$11.90 Composite	\$29.94	\$25.77
Units per month	132	208	181	141
Gas used .....	\$12.17	\$2.35	\$9.75	\$9.34

Cost of Dismantling Locomotives

	A Overhead and Locomotive Crane	B Locomotive Crane	C Overhead Crane
Per cent mill or yard scrap..	All yard	47 mill	93 mill
Gas used .....	\$36.46	\$114.40	\$47.32
Per cent good materials ....	20		24
Includes cost of removing good materials .....	Yes	Yes	Yes
Includes inspecting and shipping .....	Yes	No	Yes
Units dismantled per month..	28		3
Average cost per unit .....	\$134.71	\$216.35	\$150.40

tion costs. The locomotives are all much alike and the main difference in expense was in the method followed to dispose of the scrap.

**Discussion.**—D. R. Elmore (F. G. Exp.) was of the opinion that in revising the terms for scrap sales, the committee should have retained the original clause requiring the payment of interest and storage charges for scrap not moved by purchasers within the prescribed time limit. Replying to a question as to the practicability of selling scrap on a net-ton basis, H. H. Laughton (Sou.) stated that the Southern sells from 40,000 to 50,000 tons a year strictly on the net-ton basis. The chairman stated that the costs of dismantling shown in the report included about 22 per cent overhead for supervision, miscellaneous labor and repair costs. P. L. Grammer (Penna.) stated that the Pennsylvania finds it profitable to prepare both No. 1 and No. 2 heavy melting steel. T. J. Hegeman (C. & B. & Q.) contended that it was profitable to repair track chisels, and the report was adopted as read.

## Report on Forest Products

J. E. McNelley, Chairman\*

As the demand to remove unnecessary moisture in lumber increases, shipping weights become correspondingly less and the margin between weights ordinarily used by sellers for computing transportation costs, and actual weights, becomes greater, with correspondingly increased savings for roads that purchase on the f.o.b. mill basis and pay transportation only on the actual weight of the shipment. Reduction in the size of patterns also reduces shipping weights. The weights of American Lumber Standards patterns are approximately 100 lb. per 1,000 ft. b.m. less than A.R.A. patterns.

### Loading Ties

Two of 12 roads responding to a questionnaire on loading ties use a tie train to a very limited extent. One of these roads reported the cost of loading by this method to be six cents per tie. The other roads use local trains for the distribution of ties from treating plants and for ties loaded at the side tracks to be used without treatment. The cost per tie for loading at side tracks varies from 2 cents to 4 3/4 cents per tie. Seven lines require producers to load ties without an allowance for the loading.

Three of 20 roads replying to a questionnaire use open-top cars exclusively for ties and lumber, one road reporting a 50-per cent saving in handling; and a second road, a 25-per cent to 30-per cent saving. One road employs the method only when one size of lumber is loaded in a car.

\* Chief tie and lumber supervisor, Atlantic Coast Line.

In purchasing forest products, the railroads should insist that cars be loaded to maximum capacity. In so far as cross and switch ties are concerned, there is no occasion for deviation from this rule. Where the requirements for individual points will not warrant purchasing lumber in carload quantities, the material should be consolidated with that for other store points, and the mill instructed to load the car in station order.

All pattern and finished lumber should be loaded in closed cars, while green rough lumber and timbers should be loaded in open cars. Where combined lengths of lumber in closed cars are shorter than the inside length of the car, the vacant space should be left in the center of the car, and the material well braced, to prevent shifting and the consequent damage to the car ends.

In the 1930 report, attention was called to the possible saving in the purchase price of lumber through the use of A.R.A. alternate patterns dressed to 25/32-in. thickness. When these patterns are so dressed, they become identical with American Lumber Standards patterns and are procurable at substantial price reductions. Several roads have no difficulty in the application of the alternate patterns and the practice may, therefore, be recommended.

### Reclaiming Usable Lumber

One road has been reclaiming lumber for several years. During the past year, it reclaimed 2,127,606 ft. b.m. of car lumber, composed of the following: 230,494 ft. of short framing, 307,080 ft. of end lining, 384,007 ft. of roof sheathing and 1,206,025 ft. of decking and sub-flooring. All labor costs in connection with the work amounted to \$1,875. The value of new lumber would have been \$43,354.

One railroad reports a definite saving through the use of scrap lumber for steam fuel and heating. One large shop on this road disposed of 2,191 cords during 1931, of which 671 cords was used as steam fuel in the plant and 1,520 cords was shipped to outlying points.

The wood consumed at outlying points was used for steam fuel for pumping stations, and fuel for heating small stations. Prior to the adoption of this method of supplying wood to outside points, wood was purchased locally at a cost of \$4 per cord. There appears to be a saving of \$6,080 in supplying scrap wood to outside points from only one shop.

### Moisture Control

This committee again investigated the question of moisture by sending out a questionnaire to all of the large lumber-consuming railroads, which brought returns from eight. One road specifies that yellow-pine car lining, siding, roofing, decking, running boards, fascia boards, stiles, battens, sills, framing, side plank and end plank for rolling stock shall be air-dried. For new car construction, a second road specifies a maximum of 10 per cent for sheathing, 15 per cent for running boards, 15 per cent for nailing posts and 15 per cent for flooring, purchased either kiln or air-dried. A third road follows the A.R.A. practice for lumber in box cars, but does not check the moisture content after it is applied to the car, and allows 10-per cent moisture in wood doors.

A fourth road requires that car siding and longitudinal sheathing must be kiln-dried, but buys air-seasoned decking and endeavors to hold it in stock long enough so that it is dried to a point where shrinkage, when applied to cars, will not take place. Framing and running boards are purchased green and are air-seasoned. A fifth road specifies 10 per cent moisture in standard car roofing, 10 per cent in standard siding, 12 per cent in standard decking, 20 per cent in standard running boards, 20 per cent in framing and 10 per cent in door stocks. A sixth road has no definite practice of determining the moisture content. Car siding, lining, roofing, decking, etc., are kiln-dried, and it is practically left to the inspector's judgment to determine whether or not the lumber is dried. A seventh road tests all lumber for new equipment for moisture through the use of a standard electric kiln. Lumber purchased for repairs to cars is procured only from manufacturers that are fully equipped to kiln-dry lumber to meet the specifications. The eighth road purchases all lumber for locomotives and cars rough green and carries it in yards sufficiently long to secure thorough air drying. Lumber for single-sheathed cars is dried in company kilns to a moisture content of about 10 per cent.

### Treated Car Lumber

One road during the year 1931 treated 1,870,000 ft. b.m. of various sizes and kinds of car lumber. The cost for labor

was 46 cents per 1,000 ft. and the cost of the preservative was \$1 per 1,000 ft. b.m. The treating is by the open-tank process.  
*Discussion.*—The report was adopted as read without discussion.

# Report on Surplus Stocks

A. W. Munster, Chairman\*

A survey was presented showing what has been accomplished by the railroads following the recommendations of previous committees covering the 12 months ending June 30, 1931. A total of 119 carriers operating 232,711 miles of road were canvassed and replies were received from railroads operating 97 per cent of the mileage.

The total value of materials which the reporting carriers sold to, or bought from, other carriers, was only a fraction of one per cent of the total value of comparable material

Exchange and Sale of Surplus Material, November 17, 1931

Region	No. of Roads	Mileage	Bought from Other Roads	Sold to Other Roads	Bought from Dealers
New England	9	7,303	\$ 30	.....	\$1,525
Great Lakes	20	25,449	4,339	\$20,993	66,287
Central Eastern	15	23,990	565	3,093	9,096
Pocahontas	3	5,950	46,663	35,437	.....
Southern	17	37,448	4,240	6,430	8,937
Northwestern	12	48,752	287	2,295	28,000
Central Western	12	52,556	359	100	1,740
Southwestern	10	25,064	190	1,407	13,422
Total	98	226,512	\$56,673	\$69,755	\$129,007
Bought from Other Roads		Sold to Other Roads		Bought from Dealers	
18 roads \$10,013		12 roads \$22,283		20 roads \$49,948	
1 road 46,663		1 road 12,036		1 road 45,360	
		1 road 35,437		1 road 22,700	
				1 road 10,999	
19 roads \$56,677		14 roads \$69,757		23 roads \$129,007	

purchased new from manufacturers. A substantial portion of surplus material available for disposition included A.R.A. car materials.

It was recommended that each railroad establish an aggressive unit in their purchasing and stores organization for the control and sale of their surplus materials.

*Discussion.*—There was considerable discussion in favor of the above recommendation, G. E. Scott (M-K-T.) suggesting that the authority which has been given railroads by the I.C.C. to write off old equipment without immediately burdening operating expenses would stimulate the reduction of second-hand materials, and Chairman Thomson stating that efforts had already been made by outside concerns to promote a bureau for the sale of such materials. E. A. Clifford (C. & N. W.) expressed surprise that the roads should be showing such interest in the purchase of second-hand materials and considered that this practice would likely prove unwise and costly if carried too far.

# Manufacturing Methods

E. B. DeVilbiss, Chairman†

The committee analyzed the practices followed by the railroads in arranging for the manufacture of materials in company shops, developing the comparative costs and handling surplus materials. Manufacturing stock material performed by a railroad should be centralized. For charge-out purposes, the cost of manufactured items should include labor, material, shop expense and store expense, and where a sales tax is imposed, it should also be included. For comparisons with purchase prices, the charge-out cost should be enlarged by all other manufacturing expenses to include repairs to buildings, repairs to machinery, maintenance of buildings, maintenance of machinery and equipment, depreciation of buildings, depreciation of machinery, insurance on buildings and contents, insurance against accidents, interest, taxes, personal injuries, pensions, stationery and printing, transportation of materials, and general supervision, not included in shop and store expenses.

All surplus manufactured material should be returned to the manufacturing shop currently to eliminate the possibility that records would fail to disclose surpluses, except where the entire manufactured output is shipped to a process shop

specializing on one class of work. In such cases, the centralization point should be the process shop and such materials should be manufactured on orders of the process shop only. Surpluses should be determined by actual inspection and frequent checking with using-department representatives. Manufactured materials should be given the same inspection and test as purchased materials.

The report included a table showing on a percentage basis the comparative charges made by five railroads for the labor, shop expense, material, etc., in the manufacturing costs of five different car and locomotive parts.

*Discussion.*—Several members, including C. B. Tobey (L. V.), questioned the recommendation to include maintenance and depreciation of facilities and similar items in determining their manufacturing costs for comparative purposes, but the recommendation was strongly supported by several members, including G. D. Tombs (I. C.) and G. J. Hunter (Santa Fe), the latter contending that much cost data prepared by the railroads on their manufacturing operations are "bunk" and that most repair shops do not know what it costs to manufacture materials. The chairman also referred to the all too prevalent practice for a shop to say its buildings for manufacturing cost nothing and to fail to consider the cost of the machines.

# Purchasing and Distributing

A. W. Munster, Chairman\*

The committee emphasized the necessity, under present economic conditions, for effecting further savings in the purchasing and distribution of materials. The purchasing department must recognize and assume the obligation to provide the stores department with a dependable source of supply and with stated times of delivery or shipment. The stores department must requisition material by classes on a regular established schedule to take advantage of quantity purchase, and confine special or out-of-schedule requisitions to emergency situations. A change in the source of supply which shortens or lengthens the period required for delivery should be known by the storekeeper prior to making up his requisition.

Heretofore, stress has been placed on the obligation of the storekeeper to hold to the minimum investment and the fact overlooked that the purchasing agent can modernize his methods by reducing the time necessary to place the order and the time in which to deliver the material where it is wanted. The past few years have shown that substantial reductions can be made in so-called emergency or protective stocks by the establishment of the confidence of the using departments based on the ability to provide reasonably anticipated requirements. Further study of these so-called protective stocks will bring further reductions in investment.

A check of one railroad using the combined order and requisition form during a month with four Sundays (counting Sundays and Saturdays the same as other week-days), disclosed that the elapsed time in placing orders after requisitions were received in the purchasing agent's office was as follows:

Orders placed same day as requisition received	28 per cent
Orders placed at close of first day following	76 per cent
Orders placed at close of second day following	90 per cent
Orders placed at close of seventh day following	99 per cent

The purchasing agent must determine his sources of supply for the greater percentage of his materials in advance of receipt of the requisition and keep the storekeeper currently advised as to the time which must be allowed after the order is placed on all classes of material before shipments are made.

A procedure can often be set up whereby the storekeeper or the general storekeeper can trace or hurry the delivery of materials on orders without the necessity of going through the purchasing department if quicker action can be obtained without sacrificing correct purchasing methods.

*Discussion.*—U. K. Hall (U. P.) laid emphasis on the practice of concentrating stock at strategic points as a means of securing economical distribution and protecting the requirements of users. D. Robertson (C. N.) described the practice on the Canadian National of avoiding unnecessary purchasing by making periodical reports of the surplus material found at different points and holding conferences with the various departments to urge the use of this material in place of issuing new orders. W. S. Morehead (I. C.) laid emphasis on the importance of a constant and close personal contact between storekeepers and users as a means of determining needs and handling supplies economically, and discouraged the tendency of departments to administer their work by letter-writing.

\* Purchasing agent, Boston & Maine.  
 † Assistant stores manager, Pennsylvania.

\* Purchasing agent, Boston & Maine.



## Inventories and Stores Expenses

O. A. Donagan, Chairman\*

The committee, which is organized on a regional basis for the purpose of compiling and distributing for comparative purposes semi-annual reports of the value of material and supplies in stock and the value of material and supplies used on the railroads, reported several objections made by some railroads to furnishing these reports and the committee answered these objections.

The committee also presented a consolidated statement showing the average monthly disbursements and inventories of all railroads for the first six months of 1931, compared with the corresponding period of 1930 and 1929, this table showing a reduction in turnover as follows:

	June 30, 1929 Days' Supply on Hand	June 30, 1930 Days' Supply on Hand	June 30, 1931 Days' Supply on Hand
1. Frogs, Switches and Rail Fittings ..	119		
2. Bridge and Building Lumber, Iron Bridges, Turntables and Structural Steel ..	177	208	249
3. Signal, Interlocking, Telegraph and Telephone Materials ..	179	160	203
4. All other Maintenance of Way Ma- terials ..	85	80	137
5. Maintenance of Equipment Materials ..	96	92	107
6. Materials in Process of Manufacture ..			
7. Miscellaneous Materials Common to all Departments ..	69	59	58
8. Dining Car and Restaurant Commis- sary Supplies ..	39	36	43
Total—Items 1 to 8 ..	99	96	115
9. Ties, Cross and Switch ..	169	242	307
10. Rails, (including second-hand but not including scrap) ..	82	109	202
11. Fuel ..	40	41	57
12. Scrap ..	38	35	113
Grand Total ..	88	95	125

### Store Expenses

The committee prepared a study, based on data furnished by officers of 13 railroads, which indicate a difference of more than three to one between the minimum and maximum store expense per cent reported.

Answers obtained to nine questions particularly pertinent to the question of store expense indicate that the variations in the basic methods used in the charges and credits to and the distribution of store expense, are primarily responsible for the great variation in the results. The replies indicated that some roads are making no deductions, and on others deductions as high as 6 per cent for handling ties, rails and other materials delivered direct to the job.

Another important factor affecting the store expense is the basis on which usable second-hand or repaired material is charged when used. The road handling such materials at less than the price of new materials suffers in comparison with roads using the new price. With heavy dismantling programs carried out on some roads, unusually large quantities of usable second-hand material have been taken into stock at varying values and used in lieu of new material.

Studies of the effect on store expense of decreases in commodity prices, for 1931 as compared with 1929, showed an average price reduction in the 30 items of 14.96 per cent. This would automatically increase a 6 per cent store expense ratio for 1929 to 7.06 per cent in 1931.

### Control of Stock During Depressions

The committee endeavored to describe what special steps should be taken to control stock balances during the depression period. A study of the stock reports of 11 representative roads as of June 30, 1930, and June 30, 1931, showed that while the total stock balance showed a splendid decrease, there has been a tremendous reduction in disbursements, resulting in an increase in days' supply on hand. The only class of material showing a reduction in number of days' supply was Miscellaneous Materials Common to all Departments.

While stock balances, as a whole, have steadily decreased, even in the face of curtailment of programs, obsolete and inactive materials have increased in ratio to total stock balance, thereby increasing days' supply on hand. With the falling off of traffic, much power has been stored and only the larger or more up-to-date equipment kept in service, resulting in active materials becoming temporarily inactive. Dismantling

programs have resulted not only in large stocks of usable second-hand materials being held for future use, but have also reduced the demand for materials peculiar to these types of equipment.

Discussion.—No objections being raised to the recommendations and findings of the committee, the report was adopted as presented.

## Report on Fire Prevention

J. H. Ellis, Chairman\*

The committee reported fire losses in storehouses, and presented an index of the fire-prevention rules which have been adopted by the division. The fire losses compiled by the Railway Fire Protection Association were:

Railroad Fires			
Year	No. Fires		Loss
1923	8,395		\$9,001,122
1924	8,609		10,049,936
1925	7,866		7,397,433
1926	8,388		7,268,435
1927	4,283		4,328,631
1928	6,088		4,508,112
1929	6,556		4,376,345
1930	8,018		6,127,005
Total	58,203		\$53,057,021
1923	112	Storehouse buildings and contents	\$867,247
1924	80	Storehouse buildings and contents	187,001
1925	71	Storehouse buildings and contents	327,860
1926	49	Storehouse buildings and contents	21,466
1927	8	Storehouse buildings and contents	269,160
1928	60	Storehouse buildings and contents	25,223
1929	40	Storehouse buildings and contents	86,877
1930	46	Storehouse buildings and contents	83,248
Total	466		\$1,868,084

## Purchasing Office Methods

Arthur Aiken, Chairman†

The committee urged the more extended use of the simplified invoice and telegraph code for communicating with firms. It also recommended the use of a combined store department and purchasing department order form and submitted an example of a practical filing system for use in purchasing departments. The use of a blanket release order by purchasing departments was also favored.

### Combination Order Form

The order form can be prepared in the office of the ordering storekeeper or general storekeeper, including the order and a sufficient number of copies for the various purposes. The original copy should be the requisition form, both for convenience and because the requisition usually bears the approvals and other necessary notations.

When the purchasing agent has decided with whom the business will be placed, it is only necessary to insert a carbon and write the name of the firm, date of order, price and f.o.b. point. When contracts or agreements are in effect, the name and address of the vendor can be typed at the time of writing the requisition order, such information to be furnished by the purchasing department.

Close co-operation between the purchasing and stores department, and the education of those handling the details of ordering will keep the number of "rewrites" down to a minimum, probably not greater than 10 per cent. If 20 per cent must be re-written, there still remains 80 per cent of the work that need not be duplicated in the purchasing agent's office.

Some of the benefits which this method offers are: Elimination of writing and checking orders against the requisition in the purchasing agent's office; elimination of errors in quantity, description, etc., that may occur when re-writing is performed; elimination of one file, through the use of the requisition as the office copy of the order; shortening the time to get the order into the vendors' hands, by the elimination of re-writing in the purchasing agent's office and unnecessary signatures.

### Blanket Release Order

The blanket release order is not a blanket authority, but an order specifying definite items, and indicating the firm from

\* General storekeeper, Boston & Maine.

† Office manager, Purchasing Department, Pennsylvania.



which the material may be procured. Though quantities may not be specified, the order should contain a clause stating that it does not authorize the manufacture of items in advance of release and is subject to cancellation at any time. Standard items repeatedly ordered in large quantities, commend themselves to the use of this form.

It is considered best to take one class of material at a time and make a study of each part to see what can be ordered directly from the manufacturer. After this has been decided, an order is placed with the company for the specified items, and the stores department notified of the action taken, after which the stores will release the shipment of the quantity they require.

The blanket release order eliminates repeated orders for small quantities of the same material, tends to reduce the material stock balance by shortening the period for delivery, and reduces the number of pieces of paper that the purchasing agent must handle.

**Discussion.**—The committee's references to the use of the blanket release order for purchasing materials and the classified filing system for correspondence aroused considerable interest. It was brought out that the American Railway Express has been using the blanket release orders with excellent results for six or seven years, and the Union Pacific has been following the filing system recommended by the committee for 18 years. F. S. Austin (Boston & Albany) especially recommended the use of the filing system.

## Report on Pricing Methods

U. K. Hall, Chairman\*

The committee report contained a study of the various methods in use for pricing requisitions for material. Of 45 roads, the pricing is performed by the issuers of material on 12, while the older practice of pricing from price books or price cards in the office is followed by 33. Practically all roads are obtaining their prices at some centralized bureau, either in the general storekeeper's office, the accounting department, or at the division stores, where the prices are abstracted from purchase bills, freight, discounts, etc., being taken into consideration, or from store orders. The prices are then forwarded either direct to the stores for application to bins, articles, etc., or entered in price books or cards, according to the method used.

The roads pricing direct from price books report (a) that more accurate results can be obtained where the pricing is done by expert price clerks trained for this work; (b) that it is more economical to price in such a consolidated bureau and that it can be done with more efficient and fewer forces than where scattered among the issuers of material; (c) that it is preferable to have this work done by specialized clerks out of material-handling forces; (d) that where the issuers are pricing, it detracts from their other duties; (e) that issuers of material, receiving requisitions properly approved, have no other recourse but to fill them; and (f) that the most accurate results are obtained where specialists perform this work.

The roads using the direct method of pricing report (a) that it is more economical to have the pricing performed by the issuers of material; (b) that the method indicates to the stores department forces the value of the material and tends towards the conservation of material; (c) that it prevents a congestion of requisitions to be priced; (d) that it is more accurate as the issuers of material, being practical material men, are conversant with the actual value; (e) that it tends towards accounting accuracy for the reason that even though the description may be incorrect, the price inserted is correct for the actual article delivered.

The roads using the direct pricing, generally pass these prices on to the users by marking the prices on the article, pricing a duplicate of the requisition, pricing shipping notices, posting prices of larger or more important items at various conspicuous places, and issuing a price book to the different shop foremen.

**Discussion.**—The motion made to favor the pricing of requisitions from bins rather than in the office was followed by a spirited discussion in which the officers of the Canadian National and Union Pacific, where this system is used, supported the bin pricing as a means of avoiding inaccuracies in pricing requisitions for material and in avoiding delays resulting from congestion of the work in the offices. E. D. Toye (C. N.) considered that the increased adoption of bin pricing since it was advocated a few years ago has demonstrated its value, and O. Nelson (U. P.) stated that it has eliminated com-

plaints over pricing inaccuracies and has aided the shop supervisors in controlling their work under monthly allowances which require a knowledge of each day's expenditures. J. J. Kukis (Erie) questioned the economy of bin pricing as compared with pricing in central bureaus, however, and contended that the solution of the problem of correctly pricing inaccurately-described materials was to see that requisitions were correctly written. A vote on the motion to adopt bin pricing won by a small margin.

## Handling and Protecting Materials

O. Nelson, Chairman\*

The committee after reviewing previous reports on this subject recommended methods and practices of handling special material problems and designating the kind of equipment best adapted for each. It also presented five recommendations covering the protection of materials. It supported the recommendations of previous committees that the stores forces deliver material to users and operate all automotive equipment in large terminals.

### Storing

A canvass of various railroads disclosed the use of equipment as follows: Power lift trucks for use around stores and oilhouses, and miscellaneous yard use where driveways are paved; crane-type trucks for handling heavier items, such as castings, locomotive rods, and similar items; tractors for general use around yards; locomotive or overhead cranes for handling wheels on axles, tires, wheels, axles, locomotive frames, etc.; and gas-electric type trucks for outside work.

The committee was unable to recommend a definite plan to follow in preparing costs of shop delivery for comparisons with other roads, but suggested dividing the total labor cost of delivering materials, as obtained from time cards by the total value of material delivered to the shops during the month. It was recommended that around shops and terminals the distribution of ice should be made by store forces as well as the shipment to users along the line. Ice should be purchased locally, in cases where this can be done more economically than from shipping the ice from other points.

Approved requisitions should be furnished the stores for material to be delivered by supply train, with the understanding that a further check will be made on the ground. Line stocks should be controlled by a periodical joint check by stores and maintenance representatives, and all surplus promptly disposed of. The crawler-type magnet crane is desirable and economical equipment for supply train service.

It was recommended that shipping drums, reels, etc., which have a return value, should be concentrated at one point, and the purchasing department furnish the stores department proper shipping instructions for the stores department's use.

It was recommended that nesting boxes and movable platforms should be used as far as practicable for storing and shipping materials and where possible that this equipment should be used by manufacturers located on the line of the railroad.

### Protecting Material

It was recommended that orders placed for fabricated steel and forgings specify that the material ordered should be protected with a coat of paint, to be applied by the manufacturer, and that this practice be further extended as far as consistent to other commodities which it may be necessary to store exposed to the elements. Orders placed for boiler tubes should require the manufacturer to apply a protective coating to each tube to prevent rust. The American Railway Association practices should be followed in storing and protecting lumber. Arch brick should be stored under cover. Material subject to deterioration should be stored so the oldest stock can be issued first.

**Discussion.**—The committee adopted suggestions to call lift-truck equipment "skids" instead of "platforms" and to recommend placing intra-shop as well as all inter-shop material handling under the same force. W. S. Morehead (I. C.) stated that stores expense would be much higher today on many railroads, were it not for the utilization of mechanical handling facilities. O. Nelson (U. P.) reported that the difficulties in getting manufacturers to ship material on skids was solved in a number of cases, by furnishing them skids. J. G. Stuart (C., B. & Q.) insisted that the investment to be considered must include the skids as well as the lift trucks, and

\* General storekeeper, Union Pacific.

\* Assistant general storekeeper, Union Pacific.

also stated that it was necessary to show a reduction of more than four men per lift truck to justify the operation. L. P. Krampf (M. P.) stated that the use of 8 power-lift trucks and 17 hand-lift trucks in stores work on the Missouri Pacific is supplemented by 20,000 skids and skid boxes and that, largely as a result of this operation, the stores forces at Sedalia, Mo., were reduced from 144 men in 1925 to 78 in 1929.

## Report on Standardization

E. D. Toye, Chairman\*

The committee investigated the present A.R.A. specifications of tin, galvanized iron and steelware as approved by the Mechanical division to ascertain to what extent the specifications were being followed. It was found that very few roads are using any part of the specifications. The lack of uniformity in the specifications followed by different roads forces the manufacturer to make different articles for each road, resulting in increased unit costs. The specifications used by 18 railroads for several items of tinware were presented in separate exhibits with the committee's recommendations.

In connection with items which are in common use commercially, such as funnels, measures, coal hods and 12-qt. pails, it was the opinion of the committee that there would be considerable saving by adopting the U. S. Department of Commerce Simplified Practice Recommendation No. 55. In addition, the thickness or weight of metal should be specified so that bidders will quote on utensils of the same quality, though actual dimensions may be slightly different.

The majority of the committee felt that the grading rules for hickory handles should be revised to reduce the number of grades; and that the grading rules should be clarified by enumerating the defects which are permitted or not permitted in the respective grades. In view of the fact that some roads are successfully purchasing handles in accordance with the Simplified Recommendation of the U. S. Department of Commerce, attention was called to the possibility of purchasing satisfactory handles from these grades by proper railroad inspection, even though the requirements of the respective grades may not be as specific or as stringent as might be desired.

## Stationery and Printing

J. T. Van Horn, Chairman†

The committee reported that 12 Class I railroads have adopted the standard size letterhead, 7½ by 9½ in. Through the adoption of this size letterhead, second sheets and carbon paper, one road reported an estimated saving equal to 18,000,000 sheets of paper per annum which, in 16-lb. substance, is equal to 144,000 lb. Another road reported a saving of \$573 per annum. A third road reported a saving of \$386 per annum, and a fourth reported a saving of \$700 per annum.

### Standardization of Forms

In line with the recommendation of former committees, the committee urged a survey of printed forms for the purpose of consolidating forms, where possible, and standardizing sizes and classes of paper stock used. Through the standardization of forms, as well as of other stationery items, one member line reduced its stationery and printing expense \$130,612, or 22 per cent last year, after having made a reduction of \$150,650, or 20.6 per cent the previous year. This is a total saving of \$281,262 for the two-year period.

It was recommended that railroads operating their own typewriter repair departments authorize line offices to have repairs and adjustments made locally when the cost does not exceed five dollars. Last year, 198 railroads, bus lines, and steamship companies extended their annual passes for one year.

### Special Bureaus

Substantial savings have been reported through the establishment of typing bureaus. One member line has been operating a typing bureau since February 1, 1931, and reported an annual saving of \$8,400. Another member line, operating two typing bureaus, reported an annual saving of \$103,840. One of these bureaus handles all of the typing for the auditing department, while the other handles all of the typing for the operating department as well as most of the typing for the mail and express, valuation, mechanical, telegraph and traffic departments. Another road reported that for a 12-month

period the average cost per letter handled in the typing bureau was 5.3 cents each. This road also operates a multi-graphing bureau which handles the printing of all of its letterheads as well as some of its forms. During 1931 a total of 9,986,900 letterheads and forms of various sizes up to and including 8½ in. by 14 in. were printed at a saving of \$3,428. The typing bureau, in addition to handling typing of all correspondence, types special statements, stencils for mimeograph, and master copies for hectograph work.

*Discussion.*—W. W. Griswold, (C., R. I. & P.) considered that the use of 24-lb. all-rag paper stock by some railroads, also blue stock and stock printed in blue ink and on two sides as brought out in the report, was not justified under present conditions and emphasized the practicability of using the 16-lb. paper for all railroad correspondence. The question having been raised regarding the economy of employing outside experts to organize railway stationery work, E. A. Bromley (C. N. R.) stated that the work done by experts employed by the Canadian National has saved the railroad over a hundred thousand dollars, although agreeing with other members that a stationery committee of railway officers with proper authority could probably show comparable economies.

## Report on Terminal Storekeeping

C. W. Yeaman, Chairman\*

The 1928 committee recommended fundamentals to be followed by the terminal railways which would enable them to establish better control of materials and effect considerable economy. Subsequent committee reports have further emphasized their importance and made other recommendations. While much improvement has been made during the past few years, the recommendations have not been followed to the fullest extent possible.

Surplus material is a continual problem for the terminal storekeeper and can in many cases be returned to the trunk-line railroads. In general, the congested nature of terminal fa-

### Materials and Supplies on Terminal Railroads

Road	On Hand			Average Monthly Issue		
	Dec. 31, 1928	Oct. 31, 1931	D-Increase	1928	1931	I-Increase
1	\$ 7,943	\$ 7,660	D-\$ 283	\$ 1,242	\$ 1,544	I-\$ 302
2	285,496	149,043	D-136,453	88,852	57,434	D-31,418
3	209,616	114,563	D-95,053	117,763	82,570	D-35,193
4	195,030	163,930	D-31,100	40,662	25,320	D-15,342
5	31,472	25,684	D-5,788	3,641	2,674	D-967
7	255,103	151,958	D-103,145	54,982	21,634	D-33,348
9	54,283	41,998	D-12,285	21,452	9,660	D-11,792
10	61,784	31,732	D-30,052	7,096	5,935	D-1,161
11	309,913	257,468	D-52,445	201,216	152,866	D-48,350
13	369,492	297,966	D-71,526	87,759	54,630	D-33,129
15	43,551	42,998	D-553	26,386	13,310	D-13,076
16	120,936	79,041	D-41,895	9,101	2,162	D-6,939
17	67,218	61,472	D-5,746	15,444	7,046	D-8,398
18	567,636	381,996	D-185,640	166,610	90,251	D-76,359
19	156,896	143,936	D-12,960	61,089	45,047	D-16,042
20	85,342	88,076	I-2,734	12,219	6,605	D-5,614
21	16,909	16,267	D-642	2,055	988	D-1,067
22	98,212	89,880	D-8,332	42,657	24,770	D-17,887
23	134,277	105,340	D-28,937	21,397	12,474	D-8,923
24	37,042	27,075	D-9,967	3,688	1,355	D-2,333
Tot.	\$3,108,151	\$2,278,083	D-\$830,068	\$985,311	\$618,275	D-\$367,036
Per cent			26.72			37.25

cilities requires the operation of the stores department in much more cramped quarters than are usually found on trunk lines. The elimination of old-time wooden stock bins and use of approved open shelving, either steel or wood, will increase storage space materially, make possible a more accurate survey of stocks on hand, facilitate their issue, and improve storekeeping conditions generally.

## Report on Obsolete Material

A. S. McKelligon, Chairman†

The principal objective of the committee was to suggest ways and means to prevent the accumulation of obsolete material. It was considered desirable that the railroads have a complete and thorough method of standardization of material and supplies. After canvassing the majority of Class-I railroads and carefully considering the suggestions made, a standard master stock list was recommended, containing every item of material and supplies commonly used on the property. This list should be approved by a Committee on Standards, as well as any additions or subtractions. Pattern lists of all castings, with blue-

\*General storekeeper, Canadian National.

† Stationer, Missouri Pacific.

\* Purchasing agent, Chicago & Western Indiana.

† General storekeeper, Southern Pacific-Pacific Lines.



print references, should be part of this list and should be constantly revised.

On such large properties, more than one committee on standards should be established, one for maintenance of way and another for motive-power standards. Committees, to function efficiently, should have a limited membership.

Changes in existing standards or the adoption of new standards should have executive approval, and the chairman of the committee should, therefore, be a vice-president or an officer reporting to the president. The committee should consist of officers representing operating, engineering, mechanical, and purchases and stores departments. The committee should meet on specific dates, and should work out to the last degree every possibility of interchangeability and common usage and eliminate any possibility of duplicate standards as between departments. When executive approval has been obtained, all concerned should be advised accordingly, and drawings, if necessary, prepared and issued to cover the subject.

The purchase and stores representative serving on such a committee should place before the committee a statement of the investment in materials and supplies at every point on the railroad so that the committee as a whole in voting to supersede prevailing standards can arrive at unanimous conclusions in the best interest of the property. This is stressed particularly in connection with material that will become surplus or obsolete, to insure its definite and prompt disposal by use prior to the purchase and actual use of the new standard.

Each department should have a complete list of specifications arranged in loose-leaf book form. It was also suggested that portions of standard stock lists pertaining to the various departments should be placed in the hands of the principal approving officers, such as the electrical engineer, signal engineer, etc., so that a ready reference is always available in that department.

**Discussion.**—U. K. Hall (U. P.) stressed the responsibility of the stores forces in avoiding accumulation of obsolete and surplus stocks, by carefully watching requisitions for special materials, and emphasized the importance of insisting that technical forces should invariably designate what disposition should be made of materials rendered obsolete by revisions in standards. He was supported in his recommendation by G. E. Scott (M-K-T). On the Atlantic Coast Line, J. U. King stated that the work of the stores forces in avoiding obsolescence is greatly facilitated by using a different colored requisition blank for ordering all special materials.

## Report on Safety Practices

D. Robertson, Chairman\*

The committee presented a table showing the reportable accidents annually among all the employees of several roads during the period 1923 to 1930, together with the payments made by each road, and also presented tables showing the reportable accidents among stores employees on the same roads.

The committee also called attention to the Permanent Safety Award won by the store department of one road last year. An intensive safety program was inaugurated on this railroad in the latter part of 1928 at which time the stores department had one of the poorest safety records. On January 1, 1929, a three-year program was launched within each department and a President's trophy was to be awarded each six months to the department having the best safety record.

For the first six months' period of 1929 the Purchases and Stores Department won second place with an I.C.C. casualty rate of 22.57. The second, third and fourth periods were won by Purchases and Stores Department with casualty rates of 4.18, 6.57 and 2.45, respectively. The Purchases and Stores Department was second in the fifth period and had a clear record in the sixth and last period, thereby winning the President's trophy four out of the six periods, and earning its permanent possession. The last I.C.C. accident at the general storehouse on this road occurred in January, 1929. Success was attributed to the fact that responsibility was placed on the shoulders of supervisors for the safety record of men under their direction.

\* General storekeeper, Canadian National, Winnipeg, Man.

## Report on Loading Cars

J. G. Stuart, Chairman\*

The prompt handling and unloading is not of such great importance now as when cars were scarce. However, the practice of loading cars to capacity, handling them promptly and releasing them promptly should be established to meet the demand when conditions again become normal. On every railroad, a careful survey should be made to determine the best point from which material should be distributed. A new survey may justify the abandonment of well-established stores or material yards and the creating of new distributing points.

### Capacity Loading

Loading cars to capacity means fewer cars in the service, less switching and fewer cars to be hauled. The place to start loading cars to full capacity is with the storekeeper. He should endeavor where possible to order in carload lots and his stock books should be marked so that the stockmen will know what a minimum carload is.

Switching from one location of the storehouse to one or more additional locations to unload the material not only means a delay, but extra switching. All orders should show the section location in which the material is to be unloaded and, so far as it is possible, only material for one section should be loaded in a car. The purchasing agent should have full information concerning the location and the method used in unloading cars so that he can give the manufacturer or shipper instructions which will save labor and time in unloading.

Loading schedules must be followed so that the receiving stores can depend on receiving their material at the time specified. It is also important to change these schedules, as conditions change, so that a point that may not require more than a carload in ten days or two weeks will not receive a car each week. Where it is necessary to order empties for scrap or special loading, information should be given to those providing the cars so that empty cars of any description moving in the direction the load is going may be used. It is expensive to have cars assigned to destinations whence they must be returned empty.

### Supply Trains

A great deal of work done by supply trains, supply cars or freight-house shipments can be avoided if properly-scheduled sailing cars are used, and these small shipments are loaded in station order and the cars are transferred to local trains for distribution. In many cases, a car so loaded can be handled in through trains to distant points and start local delivery in way-freights from that point. The shipments in these sailing cars are properly waybilled and handled by the train crew, the same as they would be handled if shipped through the freight-house.

### Prompt Handling

The railroads are constantly urging the shipper to unload cars promptly. In many cases, the railroads have been putting the emphasis in the wrong place and at least a portion of the responsibility for prompt unloading of cars should be placed on those who load the cars to see that they are loaded in such a manner that the men unloading them can do so to the best advantage. Every storekeeper loading a car for another store should have a full understanding of just how the material is to be unloaded at destination.

Occasionally, there is a tendency for a storekeeper to ship material through the freight-house for another store. This in a great many cases only means extra handling and the use of extra cars. It is much better to ship carload material from one storehouse direct to another.

The unloading location at each store should be designated so that the loading storekeeper will have a thorough understanding of just how the material will be unloaded, and in making waybills he should show the unloading location. This will often save at least one day in the movement of the shipment.

The practice of ordering a car and starting to load it one day with the idea of finishing the loading the next day should be

\* Assistant purchasing agent, Chicago, Burlington & Quincy.

## Reportable Accidents (Including Casualties) in Purchasing and Stores Departments, 1927 to 1930, Inclusive

Based on Million Man-Hours Worked

Railroad Year	A		B		C		D		E		F		G	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1927	43	15.62	10	2.27	28	9.46	58	35.97	18	14.34	66	19.10	50	33.90
1928	21	7.51	13	2.68	20	6.91	32	20.88	15	11.96	60	18.32	46	41.04
1929	15	6.03	10	2.10	12	4.36	19	11.77	6	3.86	67	19.28	13	13.46
1930	7	2.79	5	1.30	7	2.89	5	3.94	4	2.96	35	12.02	2	2.69



discouraged. In most cases, it will be found more profitable to assemble the material so that the entire loading of the car can be done in one day. When one or more cars are to be loaded and several cars are to be unloaded, the storekeeper should know in advance the condition of the cars to be unloaded and begin unloading the cars that will be available for loading out the same day, saving at least a car a day in doing so.

When cars are received containing material for more than one unloading location, the storekeeper can, in many cases, truck the material to its proper destination rather than have the car switched. In many cases, this is cheaper and avoids delay to the car. This practice will apply when material is received at freight-houses.

**Discussion.**—The committee was especially commended from the floor for the completeness of its report, which was adopted without further discussion.

## Report on Commissary Supplies

L. V. Hyatt, Chairman\*

Questions submitted to nine representative railroads to ascertain the practices of handling commissary supplies developed that the stores department controls the commissary on five roads and the dining-service department on the other four roads. On three roads, the dining-car department has full charge of purchasing the supplies. On one railroad, the dining-car department had full charge of the purchases generally through its commissary buyer.

Three roads use stockbooks to regulate orders, two roads use a card system, two roads make their orders from the shelves, and the remaining two roads take stock from monthly inventory sheets.

The committee concluded that, in the purchase, storage and distribution of commissary supplies, no general policy is applicable, owing to different policies of management on individual railroads, the volume of purchases and the differences in geographical conditions. It was recommended that either stockbooks, a card record system or a monthly inventory system should be installed and used in all commissaries and that, with the exception of meats, fruits, vegetables and other perishables, a monthly check of the stock on hand should be recorded, together with the quantities to be purchased, requisition reference, price and receipts of material.

## Report on Materials' Inspection

C. K. Reasor, Chairman†

During the past months, the purchases of all roads have very materially decreased, and the organizations and plans set up to inspect and test materials when purchases were normal have undergone changes. A study by the stores and inspection departments was recommended to determine, in the light of the present situation, (1) what materials inspected at shipping points should now be inspected at destination by resident inspectors, foremen of using department or stores representatives, to effect a saving in pay-roll and traveling expenses; (2) what savings would result from having materials from large shipping centers inspected by resident inspectors or representatives of local using or stores departments instead of sending a representative from central test department; (3) what co-ordination of inspection between two or more roads is possible, particularly in the inspection of lumber, etc.

### Co-operation from Users

Especially helpful at this time are suggestions and criticisms from users. The stores departments have a special responsibility. Stockmen, storekeepers and other representatives of stores departments should be required, as a part of their regular duties, to confer with foremen and workmen in the using departments to ascertain what materials are failing and why, what substitutions can be made, and why certain materials are being used in excessive quantities, etc. Many roads report that important suggestions are received from the stockmen and the receiving forces disclosing excessive prices charged for the kind of materials ordered or required.

### Checking of Weights

About 70 per cent of the roads canvassed reported that blind tallies are not made of material received, with the exception of forest products. About 30 per cent of the roads reported that detailed tallies are made without reference to shipping in-

voices, shipping lists, copies of orders or requisitions, etc. The committee suggested that those roads that are still making blind tallies, again review their practices with an open mind.

Some roads, after checking actual material received against shipping lists, etc., are copying such lists on regular material-received forms. In the case of many materials, such as air-brake material, pipe fittings, etc., this involves many pages of transcription. In the interest of economy, such shipping lists should be attached to the regular material-received forms, when time will be saved by so doing.

Some roads report economies in receiving material from manufacturers on skids. A specified number of journal bearings and brake shoes are loaded in a skid to facilitate check and tally. The gross weights of skids can be obtained readily on depressed scales by handling with hand or power lift trucks, and after deducting tare weight, information is available for passing invoices.

Most roads purchase oils, gasoline, etc., in tank cars to take advantage of a substantial saving in price. No matter how unloaded, temperature differentials must be taken into consideration. If the oil received is measured by tank calibration, the temperature should be taken in storage tanks after unloading.

## Report on Lubrication

T. H. Ryan, Chairman\*

An investigation developed that of 45 railroads reporting, representing approximately 156,708 miles, 39 roads purchase their lubricants on contract and 13 in the open market. Three purchase both ways. Of the 45 roads, 20 purchase on the guarantee mileage basis and 25 on the gallonage basis. One large railroad, operating 10,000 miles of road, purchases basic materials and compounds its own lubricants. The committee recommended purchasing and distributing oils in tank cars to save in first cost and eliminate waste of oil, labor, handling and accounting as well as loss and damage of drums. When it is necessary to purchase in drums, one-time containers were recommended. The roads that purchase on a gallonage basis, generally inspect and analyze the lubricating oils either of all or periodic shipments. As a rule, roads operating on a guarantee basis do not inspect or analyze their oils. Of the 44 railroads answering the question, 21 inspect and analyze and 23 do not.

Reports from 45 railroads indicating the kind of material which is used in preparations for the journal boxes of passenger cars, freight cars, and tenders show no uniformity. Wool waste, cotton waste, combinations of wool and cotton, spring packing, resilient packing and fiber inserted packing are used in different combinations. In some instances, the several grades of packing are kept separate and the reclaimed packing is used in some instances only on freight equipment, while on other roads, no attempt is made to keep separate various grades of packing at the reclamation plant.

## Other Business

Other business included reports on Material Classifications, Training of Employees, and Fuel. The report on fuel, presented by J. M. Johnston (M-K-T), showed a reduction in fuel consumption on railroads from 149 lb. per 1,000 g.t.m. in 1924 to 119 lb. in 1931 and attributed this to more economical fuel performance. Stress was laid on the necessity of continued care in the inspection of fuel at the sources of supply to maintain and improve this performance. The report recommended the development of a standard specification for fuel oil and, after pointing out the changes occurring in the refining of oil, urged the more extensive use of standard specifications to avoid the purchase of inferior fuel. Conclusive tests have demonstrated, the report stated, that there are still wastes in fuel consumption which, in the aggregate, amount to an enormous sum in the course of a year.

Abstracts of the reports on the work of the Division, and the description of the centralized organization for accounting on the Missouri-Pacific will be presented in a later issue.

The following officers were elected to the General Committee: L. C. Thomson, manager of stores (C.N.); L. P. Krampf, supply agent (M. P.); F. S. Austin, purchasing agent (B. & A.); J. L. Bennett, purchasing agent (C. of Ga.); G. H. Walder, purchasing agent (C., M., St. P. & P.); H. M. Smith, assistant general storekeeper (N. P.); and J. C. Kirk, assistant general storekeeper (C., R. I. & P.). W. Davidson, general storekeeper (I. C.); C. E. Walsh, purchasing agent (Penna.); W. H. Morris, general storekeeper (Reading); J. H. Nichols, general storekeeper (N. Y., C. & St. L.); and D. McK. Ford, assistant to vice-president (C. N. R.) were elected on the nominating committee for the ensuing year.

\* Assistant purchasing agent, Wabash.

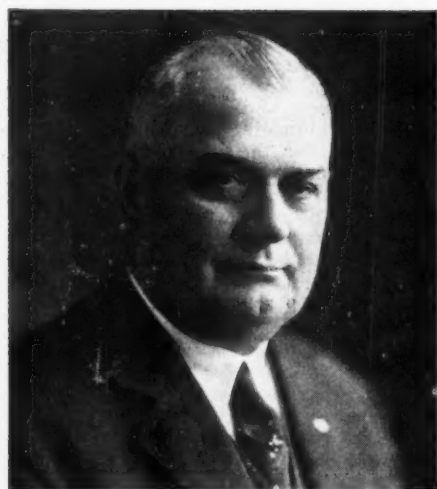
\* Commissary purchasing agent, Missouri Pacific.

† Assistant manager of stores, Erie, Hornell, N. Y.

# Mechanical Division Holds Its Annual Meeting at Chicago



Silas Zwright  
Chairman



E. B. Hall  
Chairman-Elect



V. R. Hawthorne  
Secretary

Speakers are Harry Wheeler, new president of Railway Business Association, M. J. Gormley and Frank McManamy—E. B. Hall elected chairman

**T**HE thirteenth annual meeting of the Mechanical Division, American Railway Association, was held at the Congress Hotel, Chicago, Thursday and Friday, June 23 and 24. The principal addresses at the opening session were delivered by H. A. Wheeler, president, Railway Business Association, and M. J. Gormley, executive vice-president, American Railway Association. In his address as chairman of the Mechanical Division, Silas Zwright, general mechanical superintendent, Northern Pacific, commended the work of the various committees and pointed to past accomplishments of railroad mechanical departments as a hopeful augury of what might be expected in the future. Following Mr. Zwright's address, a formal review of the activities of the division was presented in the report of the General Committee, in which the committee asked the approval of the members for the actions it has taken during the past year.

## New Officers Elected

By resolution, the rules were suspended, and the nominees for officers for the coming year presented by the Nominating Committee were elected by unanimous vote. They are as follows: E. B. Hall, general superintendent of motive power, C. & N. W., chairman; and O. A. Garber, chief mechanical officer, Mo. Pac., vice-chairman. Six members were elected to the General Committee to succeed those whose terms expired this year. These are C. E. Chambers, superintendent of motive power and equipment, C. R. R. of N. J.; F. R. Mays, general superintendent of motive power, I. C.; John Purcell, assistant to vice-president, A., T. & S. F.; R. L. Kleine, assistant chief of motive power, Pennsylvania; J. W. Highleyman, general superintendent of motive power and machinery, U. P. System; and R. G. Henley, superintendent of motive power, N. & W. Silas Zwright, general mechanical superintendent, N. P., was elected to fill the vacancy caused by Mr. Garber's election as vice-chairman.

In addition to the addresses and reports, which are summarized or abstracted below, the Joint Committee on Utilization of Locomotives and Conservation of Fuel presented a statistical review and analysis of locomotive and train operation in which the results obtained in 1930 and 1931 are compared with those obtained in each preceding year back to 1920. The committee reported that no field surveys have been made by the subcommittee during 1931.

## Address by Mr. Wheeler

In addressing the Mechanical Division Thursday morning, Harry Wheeler, president of the Railway Business Association,



stated that the railroads are facing problems more general and more difficult of solution than any heretofore confronting them, but that an opportunity now exists to take advantage of an increasingly favorable public sentiment "to secure relief from too rigid regulation, to secure the repeal of certain burdensome legislation, and to bring about either the better control of competitive agencies or such freedom of action to the roads as will enable them to compete on terms of equality."

Regarding the great opportunity for constructive work in influencing major railroad legislation, Mr. Wheeler said: "In this, the executives of the railroads hold the key to the situation because of the necessity that they agree upon a program in which pride of assumed property rights and prerogative shall be subordinated to a broad and generous recognition of present-day public interest."

"Behind such an agreement," he said, "can be marshalled as never before the forces that will make effective, sound and just provisions of law and regulation to usher in a new day of sympathetic understanding and co-operation."

Three facts were advanced by Mr. Wheeler as the most important reasons why railroad earnings must be increased: "(a) Railroad securities must be stabilized before other security issues feel a permanent favorable influence; (b) failing to secure such stabilization savings banks and insurance companies will become increasingly embarrassed in their efforts to maintain their reserves, which means their solvency; (c) in the absence of improved earnings, continuing and larger loans are inevitable from government sources to meet fixed charges, and such continuation will give the government a stake in the roads sufficient actually to imperil private ownership."

### Railroads are Large Purchasers

Mr. Wheeler called attention to the fact that the railroads of the country are the largest single buying group and that their purchase of self-liquidating goods is profitable to them and enormously important to the country. Regarding the installation of modern equipment, Mr. Wheeler said: "I do not need to use any illustration to this group who know so well what equipment of the most modern type does to the direct costs of operation and to reducing costs of maintenance and repairs. Such purchases would at once increase revenue tonnage, increase employment, increase consuming power through wages distributed, expand general business operation, and through this expansion further increase tonnage and employment not only to the point of interrupting the contraction from which we have suffered steadily since 1929, but serving to break the stranglehold of depression and produce an expansion movement that would restore a measure of normality."

"You may well ask me if I think it is a matter of justice to appeal to the railroads of the country in this critical period through which they are passing to risk the incurring of further indebtedness and the assumption of further burdens in order to turn the existing devastating tide, and my answer in emphatically no."

"Justice alone could not exact further sacrifice from the roads. It is a matter of recent history that in the generous co-operation given to the President in 1930, when he pledged the important industries to proceed with their normal operations in spite of the thickly-gathering depression clouds, purchases were made and employment continued by the roads beyond immediate requirements. To urge the roads again to step into the breach may seem unreasonable, but since only the earnings from increased operating efficiency and from increased tonnage will provide required operating earnings and lacking earnings defaults are inevitable, it would seem that self-preservation would suggest their entering the market for the purchase of self-liquidating equipment and supplies, particularly if payments can be arranged so that no immediate use of any of their present cash resources will be required."

Mr. Wheeler said that we have a right to be dismayed at the continuing process of curtailing purchases, restricting expenditures, liquidating debts and denying credit. He did not object to these processes when adjustments are necessary and wise at the beginning of a period of depression, but maintained that this negative program narrows the circle of operation; is a doctrine of defeatism, and, in the long run, will ruin any business or the business of any country.

In advocating a more constructive policy of adjustment, Mr. Wheeler said: "While it may seem like lifting ourselves by our own bootstraps, the decision to go forward of that largest single interest in the country, with the largest buying power and the largest distributive ability, may be the one factor that would turn the tide and save itself while saving the country from further indefinite suffering and loss. I hope you will believe me that when I put forward this suggestion I do not hold that manufacturers in broadly diversified lines are without responsibility to aid in this program."

Mr. Wheeler concluded his address with a concise restatement

of a few of the corrective influences evident at the present time which were also mentioned in his address before the Purchases and Stores Division, and published in detail elsewhere in this issue. He maintained that if these favorable influences are accepted as reasons for confidence and faith by the people in increasing their purchases and in preparation for further business, railroad traffic and earnings will reflect the upward trend and the depression will have entered a new and more hopeful phase.

## Mr. Gormley's Address

"Many abuses can be pointed to today as a result of the increase in private ownership of equipment in the past few years. Railroads are being required to perform extra switching and incur unnecessary empty mileage in delivering such cars to shippers for loading where there is an available supply of railroad-owned or railroad-controlled equipment."

This statement, from a part of M. J. Gormley's remarks at the 1931 annual meeting which he quoted in his address during the opening session of this year's meeting, he said, represented a situation which had not been eliminated or corrected during the past year, but had become worse.

"In the light of conditions now existing," he said, "I believe that it will not be long before the railroads will adopt a tariff regulation which will correct the troubles they are now experiencing in connection with privately-owned refrigerator cars and restore to the railroads their right to arrange for their car supply in any manner they desire, so long as adequate and suitable cars are available for movement of the traffic offered. Such a rule is now being studied by all railroads, and we have no reason to believe that it will not be adopted in the near future."

In reviewing the situation in which the railroads find themselves today, Mr. Gormley pointed out that there are almost 600,000 less employees on the railroads now than in 1929, and that all possible curtailments of expenditures are being made, but that no impairment of service has resulted. He said that while 894,264 new freight cars and 15,431 locomotives had been placed in service since 1923, the retirement of old equipment had reduced the railroad ownership of equipment by 176,302 cars and 10,905 locomotives. He attributed the excellent service of the railroads since 1923 to the investment made in equipment and other facilities and to shipper co-operation. "Of equal importance," he said, "this service has been rendered, due to efficiencies and economies effected, at reduced cost. If there had been no reduction in the unit cost of railway operation between 1923 and 1929, net railway operating income in 1929 (which as you know was the last year of heavy traffic) would have been less than it was to the extent of \$442,853,000."

"Such a tremendous saving argues irrefutably the wisdom of the expenditures which brought it about. Unfortunately, however, instead of reaping the benefit of this accomplishment, the railroads found that it was barely sufficient to offset the effects of the general 10-per cent reduction in rates ordered by the Interstate Commerce Commission in 1922. In 1929, net railway operating income would have been greater than it was, had the 10-per cent reduction in rates not been made in 1922, by \$454,793,000."

### Centralized Research

Referring to the criticisms of the railroads for a lack of a centralized research institution, Mr. Gormley cited a number of research projects which the railroads are conducting, through the agency of the various divisions of the American Railway Association, and concluded as follows: "While we feel that an undertaking of centralized research, as the term is understood in many industries, on a large scale would promise no results that cannot be attained under present facilities for research, it is possible that now, or at some future date, it may be necessary to expand in some way the work that is now being done. It is always a good thing to take an inventory of any kind, and to consider all possibilities of improvement in any direction. Under present conditions, therefore, it might be well for the Mechanical Division to give its consideration to the following questions:

"Are there possibilities for greater accomplishment in the direction of improved service and economy of operation through centralized research, under the direction of the Mechanical Division, beyond what has heretofore been undertaken?"

"If so, along what lines should such work be pursued?"

"a—In the development of standard equipment, cars and locomotives with a view to adoption of the best possible



practices, with economy in original cost and maintenance, to a greater extent than has heretofore been undertaken.

"b—In testing of new devices offered by manufacturers for improvement in locomotives and cars before adoption by any line, in order to insure experimental work being undertaken by an independent body and with a lower cost than is now incurred under present methods; with a further view of preventing expenditures for such devices until their merit is thoroughly proved by independent research.

"c—Determination whether joint inspection service of materials could be adopted with lessened expenses and without a decrease in the efficiency of the present method.

"d—Investigation of the manner of billing for car repairs, including feasibility of handling through a clearing house or otherwise, thereby eliminating accounting expense.

"e—Should there be established a clearing house to which individual railroads would report as to new methods or new devices adopted, in order that proper publicity could be given and in order that the information might be disseminated promptly to all lines for their mutual benefit.

"f—Such other matters as the Division, itself, may determine as advisable in the interest of the adoption of the best possible practice in all matters relating to equipment and mechanical devices of every sort."

## Commissioner McManamy's Address

On Friday morning Frank McManamy, member of the Interstate Commerce Commission, delivered a short address expressing the appreciation of the Interstate Commerce Commission for the spirit of co-operation and helpfulness displayed by the Mechanical Division and its members in their relations with the commission. Mr. McManamy said that with the exception of about six meetings he had been regularly attending the conventions of the Mechanical Division and its predecessor, the American Railway Master Mechanics' Association, since 1899, when he was a locomotive fireman. Mr. McManamy cited the record of persons killed and injured in 1931 as compared with 1907 to show the marked reduction in casualties which has taken place during that time and pointed out the impressiveness of this record when compared with the safety of other forms of transportation since developed. He said that railway trains were about the safest place in the country and were also becoming about the most comfortable with the advent of air conditioning, and he expressed his admiration for the initiative displayed in developing this improvement which, combined with safety of railway transportation, he predicted would lead to a return of public favor for railway-passenger travel. Mr. McManamy dwelt on the legislative character of much of the work of the mechanical division and on the mutual interdependence of the division and the Interstate Commerce Commission in carrying out the provisions of the laws pertaining to railway service.

## Locomotive and Car Lighting

W. E. Dunham, Chairman\*

Air conditioning of railway passenger cars and drives for axle generators are the major items included in the report of the Committee on Locomotive and Car Lighting. The report consists of a brief but comprehensive summary of the electrical power requirements as they exist at the present time. Features of the report are summarized in the following:

From two to six tons of ice refrigerating capacity is required properly to cool a car, depending upon the car construction and the climate in which the car is operated. Systems using ice as a refrigerant require less than one kilowatt of electric power per car for pumps, blowers and fans, the power for which can in many cases be taken from the existing car-lighting equipment.

Several types of air conditioned cars which obtain energy from axle-driven electric generators are now in operation or under construction, and the coming season should demonstrate their practicability. These systems use either a 7½- or 10-kw. generator in addition to the car-lighting generator. One generator of 15 kw. capacity will be offered in the near future. Storage batteries to furnish power when the car is standing are now being offered with capacities up to 1,000 ampere-hours at the eight-hour rate, which will go in a standard A. R. A. battery box. The same battery can also be used for lighting. Mechanical systems not using a battery for stand-by service, require a motor which must be "plugged in" to outside

power circuits. A 220-volt, 3-phase motor is recommended for this service, as existing battery charging installations are inadequate and the distribution of 32-volt power is not economical.

One system is available which uses steam for power for refrigeration. This system requires 2½ hp. of electrical energy from the car-lighting system for the auxiliary equipment. The system requires approximately 175 lb. of steam per car at 55 lb. pressure. Tests indicate that the present 2-in. train lines are sufficient for cooling a 15-car train by this method and that a 2½-in. train line should be used for longer trains. As offered, this system includes a generator and battery of proper size to take care of the additional electrical power required.

### Drives for Axle Generators

Diehl drives consisting of a split spur gear mounted on the axle driving the generator through a pinion, bevel gears and splined shaft, have now shown satisfactory service over a period of three years. One railroad has 60 cars equipped with this drive, 56 of which have been in service over one year, 17 over two years and six over three years. This road reports that since November, 1930, five equipments have made a total mileage of 785,850 without any defect which necessitated making repairs between terminals. The maintenance cost of these equipments averaged \$57.17 per car per year, \$30 of which was for grease. Tests recently completed demonstrate that a different quality of grease will operate satisfactorily and should reduce this item materially.

A Stone drive is operating on one Canadian road and the results obtained are reported as satisfactory. An application made in November, 1930, has been in continuous operation on main-line trains. On February 13, 1932, when the car was sent to the shop for general repairs, the drive was found to be in good condition with no signs of wear on worm, driving gear, housing or clutch. The total mileage obtained to date is 94,926. No repairs have been made to this equipment, the only change being one for oil, amounting to approximately 20 cents per month.

The Foote drive employs a split gear, pinion, bevel gears and splined shaft. The gears are held in mesh by a spring and in proper relation by two pitch rings. Drives of this kind have been in service approximately four years and reports of performance are satisfactory as regards cost and reliability.

The Safety Car Heating & Lighting Company in collaboration with the Morse Chain Company is developing a V-chain drive for axle generators which consists essentially of a special form of silent chain with a shroud placed around the links so as to give the chain a V-section. It runs on V pulleys and does not require sprockets.

Texrope drives consisting of three endless V belts have been applied to 15 Pullman cars. Installation requires a slot in the truck end sill which is normally covered with an angle-iron splice plate. The first drive has run 180,000 miles without repairs. It will transmit 12 hp. at 30 miles per hour and there is practically no slip.

The Dayton-Roderwald belt which consists of a V belt, 2 in. wide and ¾ in. thick, so designed as to take a fastener, has been used with several types of drive mechanisms. The belt has been used both with body-hung generators and with generators rigidly mounted on the truck. In the former case, the drive employs bevel gears and a splined shaft. In the latter case the generator pulley is mounted on a tension device also mounted on the end sill and is connected to the generator shaft through a short shaft containing two universal joints. Reports indicate that mileages of 75,000 or better are being obtained with this belt. Extensive research is still going on anticipating improvement in this performance.

A special direct drive designed by the Pullman Car & Manufacturing Corporation develops power necessary to operate its air conditioning equipment. The drive consists of a split cast-steel hub or quill mounted on rubber bushings applied to the standard car axle. The split hub carries a hardened steel spur gear at each end and spacer rings adjoining each gear to keep the pitch circles tangent. A tension spring keeps the spacer rings in contact. The driven member is attached to the truck end sill and includes a housing carrying a pair of bevel gears operating in oil. A speed-control device is interposed between the drive and the compressor.

[Additional information concerning this drive was published in the April 30, 1932, issue of *Railway Age*.—EDITOR.]

Attention is brought to the fact that loads applied to the car axle cannot be indefinitely pyramided without requiring larger locomotives or a reduction in tonnage ratings. It is suggested that railroads should endeavor to obtain in the various assignments of their dynamometer cars some comparative figures on train and car resistance with and without axle generators installed.

The committee also considered the subjects of automotive

\* Superintendent car department, Chicago & North Western.

carlighting, electric marker-light connections, battery guarantee form, revision of manual, and protection of radio antennae in electrified zones.

Action.—The report of the committee was accepted.

## Report on Safety Appliances

C. E. Chambers, Chairman\*

The report of the Committee on Safety Appliances sets forth the action taken on the report of the power brake investigation and the progress being made in the investigation of automatic train-line connectors, on which a separate report was presented by Harley A. Johnson, director of research. It also reports the favorable result of the letter ballot recently taken on three propositions: The recommendations covering the application of additional grab irons on each side of house, hopper and high-side gondola cars at the end opposite the side ladder; rules to standardize the operation of uncoupling levers, and the standard locations for retaining valves on all types of cars.

### The Power Brake Investigation

The committee quotes as follows from a report by Director of Research Johnson:

"The investigation of power brakes and appliances for operating power brake systems being conducted by the American Railway Association under order No. 13528 of the Interstate Commerce Commission has been continued during the past year. At the time of the 1931 convention the road tests were completed and the records of the tests were being compiled, analyzed and a report prepared. Reference is here made to the reports of the Director of Research at the annual meetings of the Mechanical Division for the years 1925 to 1931, inclusive, which present the progress up to June, 1931.

"The report of the investigation, which is now completed, has been prepared in two forms, one known as the abstract of the report and the other as a copy of the detail report. All of the men employed by Purdue University in connection with the power brake investigation were laid off prior to or at the completion of this report. The abstract of the report was submitted to the General Committee of the Mechanical Division and, after receiving the approval of this committee, 500 copies were printed for distribution to the members of the association.

"Four copies of the detail report were prepared at Purdue University. The secretary of the Mechanical Division, at the direction of the General Committee, forwarded the original copy of the detail report to W. P. Borland, director of Bureau of Safety, Interstate Commerce Commission, on April 1, 1932. The second copy of the detail report is on file in the office of the secretary of the Mechanical Division in Chicago. It is planned to file the third and fourth copies of the detail report in offices of the association in New York City and Washington, D. C."

### Automatic Train-Line Connectors

The progress being made in the automatic train-line connector investigation was reviewed in a separate report presented by H. A. Johnson, director of research, who is in charge of the investigation under the Joint Committee on Automatic Train-Line Connectors of the American Railway Association. Direct supervision is in the hands of a sub-committee headed by C. E. Chambers, chairman of the Committee on Safety Appliances, and of which R. L. Kleine, chairman of the Committee on Couplers and Draft Gears, and G. H. Wood, chairman of the Committee on Brakes and Brake Equipment, are members.

The report states that 46 companies or individuals have submitted plans or specifications of their devices. Nine different devices have been selected as representative of the various types, and six freight and six passenger connections of each have been ordered for laboratory tests. The table shows the names of these devices, classified as to method of support, method of gathering and type of ports. For freight service, all of these, except the Workman-Robinson, Cobb and McTaggart, have been delivered. For passenger service, the Robinson wing type is the only passenger connector which has been delivered.

Several devices have been proposed which combine the car coupler and the train-line connector in a single device, but the director reports it has been advisable to delay the consideration of devices of this type until after those which do not require a change of the present car couplers have been investigated.

\* Superintendent motive power and equipment, Central of New Jersey.

Representatives of the Bureau of Safety, the train-service brotherhoods and the manufacturers of the devices being

Types of Connectors Selected for Laboratory Test

Type of connector	Method of support	Method of gathering	Type of ports	Date of starting laboratory tests—Freight types
Robinson—Wing*	Coupler	Wing type	Butt face	Sept. 29, 1930
Robinson—Pin and funnel...	Coupler	Pin-and-funnel	Butt face 45 deg. (approx.)	Dec. 20, 1930
American .....	Coupler	Pin-and-funnel	Butt face (approx.)	Feb. 13, 1931
Roberts .....	Coupler	Wing type	Butt face	July 16, 1931
Workman—Robinson ....	Coupler	Wing type	Butt face	.....
National .....	Coupler	Pin-and-funnel	67 deg. (approx.)	April 23, 1931
Cobb .....	Carbody	Modified pin and funnel	Side port	.....
Johnson .....	Carbody with guide from coupler	Modified pin and funnel	60 deg. (approx.)	April 4, 1932
McTaggart ....	Coupler	Combination of wing and pin-and-funnel	Side port	.....

\* Tests of the passenger type were started October 20, 1931, and a test of a passenger connector on one car and a freight on the other was started on February 12, 1932.

tested have been present at various times during the conduct of the tests.

Action.—The report on Safety Appliances and the report of the director of research on the Automatic Train Line Connector investigation were accepted.

## Automotive Rolling Stock

P. H. Hatch, Chairman\*

The work of the Committee on Automotive Rolling Stock for the year 1931-1932 comprised the revision of the list of the rail motor cars put in service since 1923, bringing it up to date and arranging it more conveniently, and making a special study relating to streamlining of railroad equipment with particular reference to rail motor cars.

Questionnaires were sent out relating to rail motor cars put in service since the last report of the committee. Replies were received from 142 railroads in Canada, Mexico and the United States. Of this number but 16 had any changes or additions to their rail motor car equipment, two were making their initial report and 124 had nothing to report. The total number of cars placed in service since 1923 is now 769. During the same period the average horsepower rating of the cars put in service rose from 97.5 in 1923 to 508 in 1932. Unusually complete and comprehensive data concerning the cars in service are included as an appendix to the report. These data include salient points regarding both car body and motive power and are arranged under the following headings: Number of cars, date (year) in service; type of power plant (whether source of energy is steam engine and boiler, oil or gasoline engine, or storage battery, and whether transmission is electrical, mechanical or hydraulic); total horsepower of power plant and whether latter is composed of one or more units; overall length of car; length of engine compartment; length of baggage (or express) compartment; length of mail (R.P.O.) compartment; length of passenger compartment (total length regardless of division into smoking, passenger sections, etc.); seating capacity; and weight.

### Streamlining of Cars

Concerning the streamlining of railroad equipment, with particular reference to rail motor cars, the report states: "The railroads today can claim safety in transportation as one of their cardinal virtues. Beyond this, however, probably the two next most important qualities demanded by present-day transportation are speed and economy. Streamlining affects these two items vitally, and hence should be considered for railroad equipment where physical or other limitations do not prevent."

Information concerning a quantitative determination of the effects of streamlining are included in the report. Credit for this section of the report is given to O. G. Tietjens and K. C. Ripley, who made a study of these effects and presented their findings to the American Society of Mechanical Engineers. An abstract of their paper was published in the February 6,

\* Engineer of automotive equipment, New York, New Haven & Hartford.



1932, issue of the *Railway Age*, page 241. The report also includes a description of the streamlined cars used by the Philadelphia & Western. Models of these cars, compared with models of standard interurban equipment, indicate a power reduction which increases from 17.25 per cent at 20 miles an hour, to 44 per cent at 90 miles an hour.

It is the recommendation of the committee that further study be made of streamlining of rail motor cars with the ultimate aim of wind tunnel or service tests.

**Discussion.**—Following the presentation of the report, the question was asked the committee what the railroads will get out of the application of streamlining. Chairman Hatch replied that the value of streamlining lies in high-speed service where speeds of 60 or more m.p.h. must be maintained. Such speeds, he intimated, may become necessary in some classes of service to meet competition of other transportation agencies.

## Electric Rolling Stock

R. G. Henley, Chairman\*

Departments which have especially interested the Committee on Electric Rolling Stock include series-commutating type electric traction motors and transformer-tap voltage control of such motors. The report states that "during the past few years the design of single-phase, commutator-type traction motors has made remarkable progress and, as a result, this type of motor stands out today as a vastly improved piece of machinery." As an example of the application of such motors, the several new locomotives as developed by the Pennsylvania are discussed. These locomotives were described in the May 21, 1932, issue of the *Railway Age*, page 869.

Concerning voltage control, the report mentions the type of control developed by Brown-Boveri & Company, Ltd., Baden, Switzerland, and applied to locomotives rated at 6,400 hp. in which all of the low-tension switching equipment, with accompanying heavy conductors, are eliminated. The motors are permanently coupled to the low-tension side of the transformer and all speed control of the locomotive is effected by means of tap changer switches on the high tension winding of the transformer. These switches operate under oil, are attached to and made a part of the transformer.

Mention is also made of a commutatorless single-phase traction motor also developed by Brown-Boveri & Company. This motor was described in the April, 1932, issue of *Railway Electrical Engineer*, page 84.

The committee has studied the question of a standard system of nomenclature for electric locomotives and internal combustion engine locomotives having electric transmission. It is recommended that the American Railway Association adopt a system of nomenclature in which numbers are used to designate idle axles, letters to designate driving axles, a plus sign to show an articulated joint, and a minus sign to indicate swivel type trucks not articulated. Under this system the designation 1-D-1 indicates a locomotive with a single-axle guiding truck at each end and four driving axles in a rigid wheel base in the center.

**Action.**—The report of the committee was accepted.

## Report on Material Specifications

F. M. Waring, Chairman†

The Committee on Specifications for Materials presented a report covering revised specifications for four items, two exhibits being included to provide detailed specifications for heat-treated carbon-steel helical springs, and for certain high-pressure pipe fittings.

**Helical Springs.**—A complete revision of these specifications has been made to provide for heat-treated springs, in which the process of heat treatment is specified, rather than to attempt to secure such treatment by close tolerances on the finished springs as is done in the present specifications. These specifications were prepared by the American Society for Testing Materials, and have been published and used for about two years with marked success, as reported by the spring manufacturers, and one member of this committee who has made some experiments. It is suggested that the revised specifications be adopted as recommended practice to replace the present standard specifications.

**New Car Oil.**—This committee was requested by the Committee on Lubrication of Cars and Locomotives to consider

the inclusion of requirements for an all-year-service car oil, and recommended that, in addition to the present requirements for summer and winter car oil, the following requirements, shown in the table, for an all-year-service car oil be added

All-Year Service Car Oil

Flash, min. ....	275 deg. F.
Saybolt viscosity at 210 deg. F., min. ....	50 sec.
Saybolt viscosity at 100 deg. F., max. ....	320 sec.
Maximum pour point test ....	zero
Water, max. ....	0.10 per cent
Tarry matter, max. ....	0.05 per cent
Insoluble impurities (dirt), max. ....	0.10 per cent

to the table at the beginning of the specifications. These specifications, when approved by the Committee on Lubrication, should be submitted to letter ballot.

**Unions and Combination-Union Fittings for 300-Lb. Pressure**

—These specifications have been severely criticized because the material used in malleable-iron unions was required to meet the A.R.A. specifications for malleable-iron castings. These specifications do not permit the use of the cupola process and require a minimum tensile strength of 50,000 lb. per sq. in. and a minimum elongation of 15 per cent. A large proportion of the total tonnage of malleable-iron pipe unions and fittings is manufactured by the cupola process and, in order not to include these fittings, it was necessary not only to omit reference to the process of manufacture, but to omit the physical test requirements of the present specifications, since cupola malleable iron will not meet these requirements. Therefore, these specifications have been revised, as shown in one of the exhibits. The title and scope have been changed to include screwed fittings, which were standardized as to dimensions by the Committee on Locomotive Construction and approved by letter ballot in 1931. The process clause was revised so as to call for malleable iron or steel without reference to the process of manufacture.

**Malleable-Iron Castings.**—In accordance with a request from the secretary of the Malleable Iron Research Institute to bring these specifications into line with present-day practice, Section II, Tension Tests, has been revised to increase the minimum tensile strength from 50,000 to 53,000 lb. per sq. in., and the elongation in 2 in. from 15 to 18 per cent. It is suggested that these recommendations be submitted to letter ballot of the association.

**Discussion.**—Chairman Waring stated that following the publication of advance copies of the committee's report, a conference was held with the Committee on Lubrication, and it was decided that, in view of the fact that a satisfactory all-year car oil is still in the process of development, it is too early to justify issuing detailed specifications; that the paragraph giving these specifications in the committee's report should be eliminated and progress in developing an all-year car oil reported.

**Action.**—With this modification, the report of the committee was accepted and the recommendations submitted to letter ballot.

## Report on Locomotive Construction

W. I. Cantley, Chairman\*

The report of the Committee on Locomotive Construction is divided into five parts, including the design of three fundamental locomotive parts; standardization of high-pressure valves; advantages and disadvantages of high boiler pressure; development and use of oil-electric locomotives; and the use of back pressure and initial pressure gages, including automatic cut-off control.

### Design of Fundamental Parts

The committee, after meeting with the Committee on Wheels, recommends a flange and tread contour applicable to all rolled-steel and steel-tired wheels of locomotives and cars. This contour, which includes a reduction of flange height to one inch and elimination of the secondary chamfer, is shown in detail in the report of the Wheel Committee.

Pursuant to instructions from the Mechanical division, the Committee on Locomotive Construction recommends a proposed design of eccentric crank for locomotives to avoid the use of transverse bolts passing entirely or partially through the crank pin. The design suggested accomplishes this result with the least possible departure from consecutive and proven practices, but is purely tentative and has not yet been tested in service.

A discussion of the design of drawbars and connections

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† Engineer of tests, Pennsylvania.

\* Mechanical engineer, Lehigh Valley.



between engine and tender is included in this part of the committee's report. It covers drawbars, safety bars and chains, and affords simple formulae for determining the proper dimensions and proportions of these important parts.

The committee report includes a standard design and specifications for 300-lb. globe and angle valves for steam locomotives. The factor of safety for the valve design suggested by the committee ranges from 16 for the  $\frac{3}{4}$ -in. valve to 9 for the 3-in. valve, with intermediate sizes in proportion. This is said to be not a breakage factor but a leakage factor, that is, the point at which leakage will occur around the valve bonnet.

The recommendations of the committee for a standard valve for pressures higher than 300 lb. could not be covered by the committee this year and are planned for presentation in a subsequent report.

### High Boiler Pressures

This part of the report covers a study of 2,889 locomotives with conventional-type fireboxes, including one locomotive with 325 lb. pressure; 90 with 275 lb. pressure; 1,416 with 250 lb. pressure; and 713 with 225 lb. pressure. Considerable information regarding high-pressure locomotives used on 21 individual roads is included in the report; also a discussion of multiple-pressure locomotives and water-tube firebox boilers on the Baltimore & Ohio.

This part of the report is concluded with the following discussion of the advantages and disadvantages of high boiler pressure.

"Within reasonable limits of high steam pressure for locomotives, the amount of energy that can be stored in a given quantity of steam is increased by increasing the pressure and temperature of the steam, consequently less water is required to develop a given amount of power. The increasing power developed is obtained by expanding the steam to a greater degree in the cylinders. Greater capacity engines can be designed for the same weight and more efficient use of the steam secured, through smaller cylinders, valve chambers and steam pipes with reduced area through which heat can be lost to the atmosphere by radiation.

"Disadvantages include: difficulty with cylinder and valve lubrication causing increased maintenance, necessitating stronger globe valves, pipe and cab fittings, etc. It may be desirable and probably necessary to discard the piston valve in favor of some form of valve, such as the poppet valve, which does not require lubrication."

### Oil-Electric Locomotives

The report includes a careful record of information secured from manufacturers and users of oil-electric locomotives entirely apart from gasoline-operated machines of the same general character. This information is presented in tabular form, the first three tables covering 300-hp. locomotives on 13 roads; the next two tables, 600- and 800-hp. locomotives on 8 roads. One of the charts shows graphically the total number of oil-electric locomotives in railroad service and

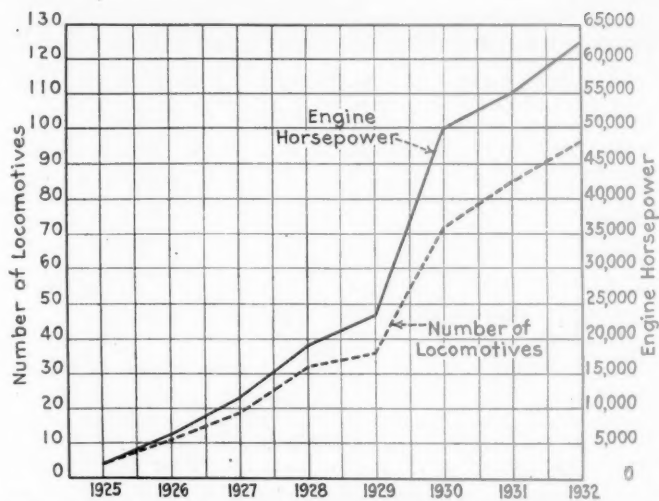


Chart Showing the Number and Aggregate Horsepower of Diesel-Electric Locomotives in the United States

the horsepower rating for all of these machines in the United States for the years 1925 to 1931, inclusive. As shown in the chart, the total number of locomotives as of January 1, 1932, is about 96 and the aggregate engine horsepower approximately 62,000. The report also includes a chart showing comparative speed-tractive-force curves for the oil-electric locomotive and the steam locomotive which it replaces. The greater starting effort available is illustrated; also, the lower hauling capacity at speeds above 8 m.p.h.

In discussing the comparative costs of oil-electric and steam operation in identical switching service, the committee reports: "From this it will be observed that the first costs of the oil-electric locomotives are considerably higher on the horsepower basis and the total operating costs per hour, including fixed charges and depreciation, while showing considerable fluctuation, are somewhat less than steam operation costs per hour. It is evident that with the higher availability for service possible from the oil-electric locomotives, and lower terminal expense for standby losses, the use of the oil-electric locomotive provides more hours of service with efficient and economical performance."

The report calls attention to the steadily improved design of the steam locomotive, resulting in a highly efficient machine for all classes of transportation, including local and terminal service now handled by oil-electric power. From the standpoint of smoke and noise prevention, the oil-electric locomotives have an important advantage for terminal and city-yard operations, tunnel runs and transfer operations in yards adjacent to residential sections.

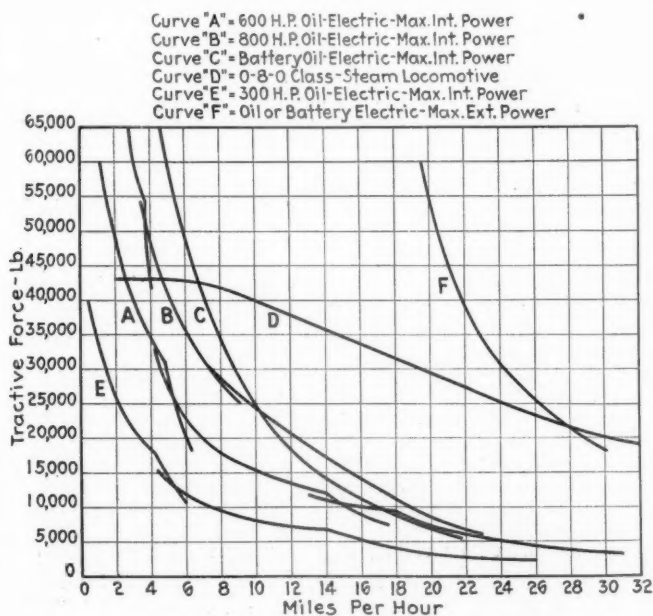
### Cut-Off Control

Referring to a cut-off control device automatically operated by the back pressure, the report states that 96 units of this device are in service at the present time on 13 railroads. The report approves the general principle of operation of this device and states that its mechanical features, while somewhat complicated, are not objectionably so.

Another device, of which 600 units are in service on 16 railroads, is one whereby the proper cut-off is indicated by the speed of the locomotive. The report states that while this device does not control the cut-off automatically, it gives clear indications to the engineman on a cab gage of the adjustment in cut-off which is required to obtain the maximum power available corresponding to the locomotive speed. Regarding the performance of this device, the report states: "Successful results are obtained when the engineman pays strict attention to the indications of the control gage and handles his reverse gear accordingly. A careful check of the records from this device are helpful in designating those enginemen who need instruction in operating methods. Reports from several railroads using this advice indicate a substantial saving in fuel, as well as an increase in tonnage rating for engines using the device."

The report concludes with a brief discussion of the general use of back-pressure gages as a guide to locomotive operation in obtaining maximum fuel economy and increased tonnage.

**Discussion.**—The necessity of two bolts through the eccentric-crank head to obtain the required fit on the crank pin was questioned and Chairman Lanning stated that the eccentric crank was slotted on the center line to give both bolts effective draw. He said that the collar and longitudinal bolt through the crank pin are necessary as a safety measure



Comparative Speed-Tractive-Force Curves of Oil-Electric, Battery-Oil-Electric and Steam Switching Locomotives

to assist in holding the eccentric crank and particularly the keys in place, preventing the latter from working out and striking the eccentric rod.

In connection with that part of the report devoted to higher boiler pressures, the necessity of a boiler of a type differing from the conventional design was questioned, and the proper treatment of water suggested as the simplest way to reduce maintenance. On one road where all waters have been treated for several years, broken staybolts amount to only a little over two per engine per year.

*Action.*—The report of the committee was accepted.

## Report on Loading Rules

Samuel Lynn, Chairman\*

The changes in the rules recommended by the committee this year are confined to the general rules, Group II covering the loading of structural material, etc., and Group III covering the loading of mining cars, engines, boiler shells, machinery, etc.

The revisions in the general rules are largely to adapt them to the increasing length of cars. The tables under Rule 13 have been revised to coincide with Rule 23 to show the permissible widths of loads overhanging up to 30 ft. on cars 50 ft., 54 ft., 58 ft., 62 ft., 66 ft. and 70 ft. in length over end sills. The tables under Rule 23 have been similarly revised and a table has been added showing the length of overhang and widths and weights on 60,000-lb. capacity flat cars. The illustrations and tables under Rule 30 have been revised to provide for intermediate lengths of loads, to provide 3 in. clearance on the sides of the loads and to simplify the rule.

### Group II—Structural Material, Plates, Pipe, Etc.

Rule 201 has been revised to provide for the use of clamps not more than 7 ft. apart on plates too wide to be loaded flatwise on gondola cars in order to coincide with the present spacing of stake pockets.

Rules 214 and 217 have been changed to specify in greater detail the methods of securing structural material, plates, girders, etc., in single overhanging loads and to permit the loading of longer material on the car floor between the bearing timbers.

Rule 224 has been changed to provide for 4 in. clearance on the idler cars only in loads on single cars overhanging both ends of the car.

Rule 228 has been revised to bring the side clearance of twin or triple loads of structural material, etc., into conformity with Rule 30, and the list of materials under Rule 238 required for loading girders in twin or triple loads has been revised.

Rule 249. A number of revisions have been made in Rule 249 covering the loading of pipe on open cars, most of which pertain to the proper use of tie wires and to the blocking of pipe in the top row when it does not completely fill the space between the stakes.

The spacing of bearing blocks between tiers of pipe has been changed from a minimum of 6 ft. apart to a maximum of 6 ft. apart.

Rule 250-A. An addition to Rule 250-A covering the alternate method of loading wrought pipe 30 in. in diameter or less in gondola cars has been made to specify the use of bearing pieces between tiers, not less than 1 in. by 4 in., extending across the full width of the load not more than 6 ft. apart.

Fig. 87 under Rule 262 has been revised to show the loading of iron ore, limestone, or similar material in a four-door hopper car.

### Group III—Boiler Shells and Machinery

The major part of the revisions in this group pertain to the loading of cylindrical tanks and boilers.

Rule 302 has been enlarged to provide for the loading of long cylindrical commodities weighing not more than 30,000 lb. and not over 80 ft. in length on stationary bolsters when loaded on two cars, and on pivoted bolsters when weighing more than 30,000 lb. and loaded on two or more cars. Figs. 100-A and 100-B have been added to illustrate these types of loadings, and Fig. 101-H has been added to illustrate the use of steel bracing and bands which may be used for tanks more than 8 ft. in diameter.

Rule 302-A contains a number of revisions, which include insertions of references to the illustration numbers in Fig. 101-A which illustrate the type of loading tanks of small diameter longitudinally on the car floor which is being covered

in the text. The rule has been amplified to cover in greater detail some of the specific methods of loading.

Fig. 104 under Rule 305 showing the loading of engines, tractors and similar machinery weighing over 8,000 lb. on flat cars has been revised.

Rule 306 has been amplified to provide that, when pivoted machines are shipped on their own wheels with the boom detached and loaded on an adjacent car, but with the cables still attached, the uncoupling apparatus on the couplers between the two cars must be disconnected so as to make them completely inoperative, or locked. Figs. 104-B, 4-A and 4-B illustrate these methods of safeguarding against the possibility of a separation between the two cars in transit.

*Discussion.*—A suggestion was made that operating officers, particularly agents, should have the loading rules placed in their hands because inspectors are unable to determine how box cars are loaded. In answer to this suggestion, Chairman Lynn called attention to the fact that the committee is dealing with commodities mostly loaded in open cars, whereas the loading and packing requirements of most of the commodities loaded in box cars are covered in the tariffs. He referred to the fact that some joint study is being given to these problems.

*Action.*—The report was accepted and the recommended changes in rules submitted to letter ballot.

## Report on Tank Cars

G. S. Goodwin, Chairman\*

During the year the Committee on Tank Cars considered a total of 130 dockets and applications for approval of design, of which 81 applications covered new cars or new tanks for existing cars of fifteen different classes. A total of 458 cars were affected. Twenty-seven applications covered alterations in existing equipment and 22 applications were for approval of tank-car appurtenances.

Extensive tests were recently completed on forge-welded tanks and plates. The committee has recommended to the Interstate Commerce Commission a modification in container specifications 105-A to permit the use of natural gas into which superheated steam has been introduced for the fabrication of this class of container. Tests were also conducted on electric-welded tanks which were made along the same lines as the tests of the forge-welded tanks. These tests indicated that tanks fabricated by fusion welding would satisfactorily meet the requirements for safety and service when properly constructed. The committee is continuing this study with a view to preparing tentative specifications. In the meantime it is recommending to the Interstate Commerce Commission that permission be given for the fabrication of ten Class ICC-105A400 fusion-welded tanks for experimental service in transporting commodities, in which the A. S. M. E. specifications for fusion-welded non-fired pressure vessels, including x-ray examination of all-welded seams, will be followed.

The committee has completed its check of designs of dome closures, and proposes to bring such equipment into compliance with the requirement of paragraph 243(c) of the I. C. C. regulations for transportation by rail of explosives and other dangerous articles in freight service. It also reported on the hearings before the I. C. C. relative to the factor of safety permitted in containers constructed under specification ICC-107A3350. The commission issued an order canceling this specification and promulgated a new specification, effective April 14, 1932. In the new specification is incorporated a definite relation between minimum ultimate strength of the tank material and maximum stress produced by the lading under maximum temperature encountered. This specific relation is equivalent to a factor of safety of 3.6 at 130 deg. F., or 4.0 at 70 deg. F.

Two extensions of the effective dates for tank-car requirements, Interchange Rule 3, and several modifications of the same rule relative to the application of new tanks to old underframes and trucks were recommended. The committee is continuing its study of the patching of tank cars.

In presenting the report, Chairman Goodwin called attention to the fact that since the report was written, the Interstate Commerce Commission had issued an order covering the committee's suggestion in respect to lap welding by the water-gas process. This provision of the order reads as follows: "5 (a) —Welding—All seams must be lap welded by the water-gas process, hammered or rolled, or other lap weld hammered or rolled process, which investigation and laboratory tests by the Mechanical Division of the American Railway Association have proven will produce equivalent or superior results."

*Action.*—The report was accepted.

\* Assistant to general superintendent motive power, Chicago, Rock Island & Pacific.

\* Superintendent rolling stock, Pittsburgh & Lake Erie.



## Report on Wheels

A. Knapp, Chairman\*

The report of the Committee on Wheels is featured, this year, by important recommendations regarding cast-iron wheels, particularly as relates to the depth of chill. Minor changes and refinements in the manufacture of wrought-steel wheels are reported and a new A.R.A. standard tread and flange contour suggested, in which the elimination of the chamfer promises to effect substantial reductions in thermal checking under heavy brake applications.

### Chilled Car Wheels

"One feature of the specifications which has caused considerable controversy is a correct and uniform interpretation of Sec. 2, Par. C, specifying chill limits. The manufacturers have been experimenting and testing various schemes for standardizing the depth-of-chill measurements and have finally developed a set of full-size photographs illustrating clearly various degrees of chill depth, with complete identification of each illustration and a standardized indication of the actual chill depth. A complete set of the photographs with the key to the standardized measurements has been furnished to each wheel foundry represented in the association. The manufacturers' association has in addition furnished three photographs illustrating minimum, normal and maximum chill wheels which are reproduced in this report for the information of cast-iron wheel foundries operated by various railroad systems. The illustration shows (left to right) a minimum chill depth, namely  $\frac{1}{2}$  in.; normal chill depth, namely  $\frac{3}{4}$  in., and maximum chill depth, namely  $1\frac{1}{4}$  in.

"The collection and study of additional photographs will be continued by the manufacturers and this committee and further recommendations will be made in the next annual report. The subject is so important, however, that the committee recommends another revision of the cast-iron wheel specifications this year to clarify the intent of the chill requirement. The present specifications refer to chill as 'clear-white iron', whereas various railroad and manufacturers' specifications refer to it as 'chill', 'effective chill', etc. The important change in the specifications, therefore, is the substitution of the word 'chill' for 'clear-white iron' in the first, second and third sentences of Par. C, Sec. 2, and in the second sentence of Sec. 6."

The committee report also suggests a revision of the specifications to define "drawn hubs" and to indicate a standard marking for cast-iron wheels.

### Cast-Iron Wheel Defects and Condemning Limits

The committee acknowledges appreciation for the co-operation and assistance rendered by the Association of Manufacturers of Chilled Car Wheels and by various representatives of railroads and private car lines in the study and development of intermediate tread-defect limits and the new remount gage submitted by the Wheel Committee to the Arbitration Committee and recommended by that committee for submission to special letter ballot.

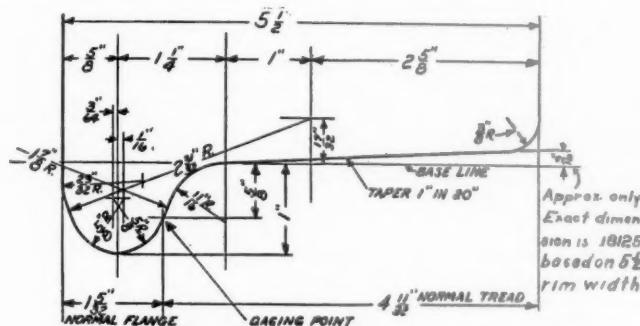
### Wrought-Steel Wheel Design

The committee, in co-operation with the Locomotive Construction Committee, proposes a design of standard tread and flange contour for all wrought-steel and steel-tired wheels in which the flange height has been reduced to one inch and the secondary taper eliminated. Regarding this new design (illustrated) the committee reports: "The difference in flange

\* Inspecting engineer, New York Central.

thickness between the  $1\frac{1}{8}$ -in. flange for driving and trailing wheels for road service and the proposed 1-in. flange, measured from the gaging point on the face of the flange to the back of the rim, is .025 in., as the nominal 1-in. flange is a trifle less in thickness at the gaging point, due to its  $11/16$ -in. throat radius compared with the  $5/8$ -in. throat radius specified for the  $1\frac{1}{8}$ -in. flange. This is within the specification tolerance and will not affect existing standards for wheel spacing. The tread taper of 1 in 20 is maintained, but it is extended to the junction with the  $3/8$ -in. radius at the front face of the wheel rim or tire with a total drop from the base of the flange to the front face of the wheel rim or tire of approximately  $3/16$  in.

"The purpose of the proposed change is to standardize all wrought-steel and steel-tired wheel tread and flange contours, with the consequent elimination of gages and turning tools. The design of the 1-in. flange will offer greater resistance to thermal checking of flanges under application of flanged brake shoes. The elimination of the secondary taper will increase the bearing area of the tread from  $1\frac{1}{8}$  in. to  $3\frac{1}{4}$  in.



A.R.A. Contour with Secondary Chamfer Element

and eliminate the break at the intersection of the two tapers. This should reduce the tendency to develop thermal checks, a large percentage of which center at this point on the present tread contour. Service tests which have been under observation since 1926 show very little, if any, difference in service life which can be attributed to tread taper or elimination of the secondary taper. The experience of a large eastern railroad, however, indicates practically complete freedom from thermal checking—a defect which is causing much concern on some railroad systems."

The committee also is considering a recommendation to standardize the tread and flange contour of all types of one-wheel wheels. The committee report includes a detailed discussion of thermal checks in wheel rims. Regarding the defects and condemning limits of cast-steel wheels, the following statement is included in the report:

"The committee is requested to express an opinion relative to a proposed scheme for turning Davis cast-steel wheels. The subject has been investigated and data furnished which indicates that the strength of the Davis cast-steel wheel will equal the strength of a wrought-steel wheel through the throat to the underside of the wheel rim. In view of this data, it is the opinion of the committee that wheels of this type may be safely turned and reapplied to service by individual roads desiring to do so, providing sufficient metal is left in the rim to insure that the wheels will not wear below the condemning limit specified for wrought-steel wheels, namely  $1\frac{1}{8}$  in. for freight and  $1\frac{3}{8}$  in. for passenger cars, when measured through the throat to the critical line on the underside of the wheel rim,



Views Illustrating Various Depths of Chill in Cast-Iron Wheels (Left to Right): Minimum Chilled Depth  $\frac{1}{2}$  In., Normal,  $\frac{3}{4}$  In., and Maximum,  $1\frac{1}{4}$  In.

as shown in Fig. 4, page 261, of the 1932 interchange rules."

The report is concluded with recommendations regarding the symbols for marking defective cast-iron and cast-steel wheels, also wrought-steel and steel-tired wheels.

**Discussion.**—The change in the wheel tread to a single unbroken taper, which the committee recommends be adopted for all standard multiple-wear wrought-steel and steel-tired wheels and which it is considering as of possible future application to the present standard single-plate cast-iron wheel, received considerable favorable comment. As the result of some objections to its immediate application to the cast-iron wheel, the chairman emphasized the fact that so far as this type of wheel is concerned, the committee is now seeking information on the basis of which it may present future recommendations.

The question of the depth of chill aroused extensive discussion. Most of those who referred to it commented favorably on the value of the photographs to which the committee referred as a means of securing more uniform interpretation of the depth of chill by different inspectors observing a single specimen. Some of the members, however, expressed their opposition to the increase in the depth of chill from 1 in. to 1 1/4 in. One member pointed out the fact that only 7/16 in. of tread wear is available before a wheel is condemned and that the deeper chill increases the liability of broken rims and flanges. As the discussion progressed, however, it was made clear that the photographs merely represent the present specifications, and that these specifications had to be drawn so that the manufacturers could practically comply with them. The less precision in judging the depth of chill, the wider the variation required. The comment in the discussion indicated a general acceptance of the idea that the photographs will increase the precision of measurement in inspections.

Some protests were expressed against the constantly increasing number of gages which are becoming a burden to inspectors. It was brought out, however, that the gage, referred to in the report of the committee, is not an inspector's gage, but is intended for use at the wheel shop only. Chairman Knapp of the Wheel Committee expressed sympathy with this situation and assured the members that the Wheel Committee was giving serious thought to the problem, but so far has found no practicable means for simplifying the gages.

**Action.**—The report was accepted and the recommendations of the committee submitted to letter ballot.

## Report of Arbitration Committee

T. W. Demarest, Chairman\*

During the year the Arbitration Committee decided Cases 1684 to 1701, inclusive. Modifications were made to Rules 73, 74 and 82 to provide for the use of the new tread-worn-hollow gage for remounting cast-iron, cast-steel and one-wear wrought-steel wheels as recommended by the Committee on Wheels. Recommendations were made for the revision of Rules 4, 32, 44 and 66 and a new Rule 45 was also recommended. These changes were recommended as a result of conferences with representatives of the American Petroleum Institute. The committee reported progress relative to the simplification of accounting for car repairs, which work is being carried on with the co-operation of the Committee on Prices for Labor and Material. The proposed changes recommended by the Committee on Prices were recommended by the Arbitration Committee for adoption. Attention was again directed to the fact that the Arbitration Committee will not consider questions unless submitted in the form of arbitration cases according to Rule 123.

The committee recommended that the effective date for prohibiting brake-beam hangers designed with eyes which are not formed solid as prescribed in Rule 3 be advanced to January 1, 1934; the effective date for applying metal badge plates showing the dimensions of brake levers standard to the car be advanced from January 1, 1933, to the same date in 1936. The effective date for applying the new standard Type E couplers was advanced from August 1, 1932, to January 1, 1933. This action was taken to permit the completion of cars previously contracted for. With respect to draft-key retainers as prescribed in Section (d), Rule 3, the effective date was advanced to January 1, 1934.

The committee recommended two new paragraphs be added to Section (d), Rule 3, requiring standard draft gears to be applied on all cars built new on or after January 1, 1934. This action was taken on the recommendation of the Committee on Couplers and Draft Gears. The effective date for spacing the side-stake pockets on flat cars built new on or after January 1, 1918, and flat cars rebuilt on or after July 1,

1928, was advanced one year to January 1, 1934. A similar recommendation was made with respect to equipping flat cars built new or rebuilt on or after July 1, 1928, which must be equipped with stake pockets 4 in. wide by 5 in. deep.

The committee recommended a new fourth paragraph be added to Section (s), Rule 3, which requires that the load-limit marking, as provided in Rule 30, be stencilled on all cars, except tank cars and live-poultry cars. This was made effective January 1, 1933, and was recommended to comply with the intent of Rule 30.

Further recommendations were made with respect to the interchange rules covering the stencilling, tank and frame construction, safety appliances, and dome covers of tank cars.

The committee recommended that the extended time limits of the second paragraph of Rule 5, as shown in Supplement No. 1 to the current code, be continued until January 1, 1934. This action was taken by the General Committee because of the curtailment in car repairs resulting in the holding of bad-order cars. The committee also recommended that the fifth paragraph of Rule 12 be modified, effective August 1, 1932, to read as follows: "Joint evidence must be obtained within 90 days after first receipt of the car home and said joint evidence shall not be valid unless used within 28 months from date of issue." This recommendation was made because of changes in Rules 5 and 94.

The committee made a number of detail recommendations with respect to changes in Rule 22 relative to the splicing of center sills. The recommendations include provisions for both riveting and welding.

Modifications are recommended for Rule 32 with the object of more equitably apportioning the responsibility for damage. Provision was made in Section (b) for damage due to sideswiping; misplaced switches; wrong or misinterpreted signals, or failure to give or observe signals; letting cars get away on incline, or failure to properly control moving cars with car-retarding device. Section (c) of the rule was changed from "sideswiping" to "train collision" and Section (d) was changed to read: "Impact switching: Damage to extent shown in Rule 44 will be delivery company responsibility. Damage to less extent will be owner's responsibility, except where caused under conditions referred to in Sections (a), (b), or (c)." These proposed changes eliminate or transfer to Section (b) of the rule items 1 to 7, inclusive, under Section (d) of the present rule.

The new Rule 45 recommended by the committee states that, "Cars shall not be accepted from the owner with the center sill or center sills bent between the bolsters when the deflection is in excess of 1 1/2 in., unless the defect card of the car owner is attached to the car. Such defect card is an acknowledgment of responsibility for any additional deflection due to further bending of the sills. The handling line, however, will be responsible for such sills if broken under the provisions of Rule 32." This rule was added by the committee properly to place the responsibility for progressive damage to car sills.

Recommendations were also made to passenger-car Rule 2 whereby the effective date for accepting in interchange cars other than passenger-carrying equipment not equipped with 2-in. metallic steam-heat connectors was advanced to October 1, 1933. The effective date for passenger-carrying equipment thus equipped was advanced to January 1, 1934. Recommendations were also made for modifications to passenger-car Rules 7 and 13 relative to couplers, coupler attachments, journal bearings, etc.

**Action.**—The report of the committee was accepted.

## Prices for Labor and Materials

A. E. Calkins, Chairman\*

The Committee on Prices for Labor and Materials continued its work of analyzing material, labor and new equipment costs under A.R.A. Interchange Rules 101, 107, 111 and 112 of the Freight-Car Code and Rules 21 and 22 of the Passenger-Car Code, with the object of providing an equitable basis for inter-road billing. It also considered the subject of simplification of the pricing rules in an effort to effect further economies in the cost of billing car repairs. Modifications proposed in the report of the committee eliminated from the rules a total of 242 items. This work, together with the effort to simplify prices, it was felt would effect a considerable decrease in the correspondence relative to billing transactions. The committee recommended that the effective date of the proposed modifications be set at September 1, 1932.

Under Rule 101 the prices for air-brake parts, box lids,

\* General superintendent motive power, Pennsylvania.

\* Superintendent rolling stock, New York Central.



brake shoes, coupler parts, journal bearings, etc., were modified to meet present prices and labor conditions. A few prices, most of which are in connection with coupler repairs, were increased. Credit prices for cut-out cocks complete were reduced 33 cents; brake shoes, 3 cents, couplers, 50 cents, etc. A large number of the modifications were made to meet the requirements of changes in design.

A total of 188 items were eliminated from Rule 107 by consolidating a large number of items which covered obsolete construction. A number of items were relocated under Rule 108. The permissible charge for jacking was eliminated from all but a few items which are covered in a new, proposed item 219-a. A new item 240-a was set up to provide specific allowances for pins and keybolts. New item 289-a was added to cover screws applied to a car, and additional details were listed under item 433 to provide for all items not specifically covered in the rules which are secured by bolts, nuts, rods, pins, keybolts, etc. Recommendations were also included in the report of the committee which set up prices for various lumber operations on board-foot measure and to include material for paint, nails, screws, lags and bolts. A new item 207 was added to provide a charge for replacing coop flooring in poultry cars.

Item 29 of Rule 111 was modified to establish an average unit charge of \$4.73 for the cleaning, oiling and repairing of triple valves and brake cylinders to include additional details which, under the present rule, has resulted in many controversies. Item 6 of this rule was also modified to include various cylinder details with the object of eliminating numerous controversies which have occurred in the past. The new allowances recommended were based on reduced labor rates and on 10-in. brake equipment with which a majority of the cars now in service are equipped. The former prices were based on 8-in. equipment. Recommendations under Rule 112 respecting reproduction pound prices of new freight-train cars of all classes were made so that the supplement of August 1, 1932, would reflect 1931 costs in lieu of 1930 figures which are shown in the present code.

No changes were recommended in the present per pound price for tank, refrigerator and poultry cars because of the small number built in 1931. However, the specifications with respect to refrigerator cars as shown in Item 5, Rule 112, were modified to provide for additional classes of cars. Item 9 relative to all-steel tank cars was also modified for the same reason.

The prices under passenger-car Rule 21 were modified to conform to reduced A.R.A. labor rates; for example, the present price of \$5.25 for ordinary cleaning of the interior of a car was reduced to \$4.80, and the labor charge for changing wheels, two outside pairs, was reduced from \$13.35 to \$12.14. Other modifications in prices were made for cleaning baggage cars, mail cars, vestibule cars, flushing batteries, cleaning triple valves, and other air-brake equipment, the reductions in price of which averaged from 5 to 15 cents per item.

Forty-one items were eliminated from passenger-car Rule 22 as they were duplicates of similar items in the freight-car rules and to which freight car prices apply.

The committee intends to investigate labor costs again in October and if sufficient change develops, the necessary revision will be made and inserted in the rules to become effective January 1, 1933.

**Action.**—The report of the committee was accepted.

## Brakes and Brake Equipment

G. H. Wood, Chairman\*

The Committee on Brakes and Brake Equipment completed its study of bottom-rod and brake-beam safety supports for four-wheel freight-car trucks which it initiated in 1930, in which the Car Construction Committee co-operated, and recommended four non-patented arrangements which have been used successfully on a number of roads. It also approved several patented brake-beam safety supports which it believes meet all the requirements for such a device. The committee proposed to make compulsory the application of such designs and recommended, subject to the approval of the Arbitration Committee, that a new section to Rule 3 be adopted to provide that on and after March 1, 1933, all new cars shall be equipped with brake-beam and bottom-rod safety supports to conform with its recommendations. The committee also recommended that, after a date to be determined by the Arbitration Committee, no car will be accepted from the owner unless equipped with suitable brake-beam safety supports.

The committee recommended that the pipe fittings for freight- and passenger-car air piping be extra heavy and in accordance with the dimensions and material requirements adopted by the A.R.A. last year for locomotive use, except where special connections are used to specialty devices. It also recommended that the location of the emergency valve and car discharge valve cords or attachments on cars having observation platforms be located as shown in the drawing. This arrangement eliminates the need of employees being on the platform to operate the valves, which frequently annoys passengers who are occupying the platform.

### For Recommended Practice

It recommended the following be submitted to letter ballot as recommended practice:

"Remove from the observation platform of all private or business cars, parlor cars and other cars having observation platforms, the conductor's valve and signal car discharge valve located over the window under the hood, and also cords or other attachments accessible from the observation platform attached to such valves inside the car.

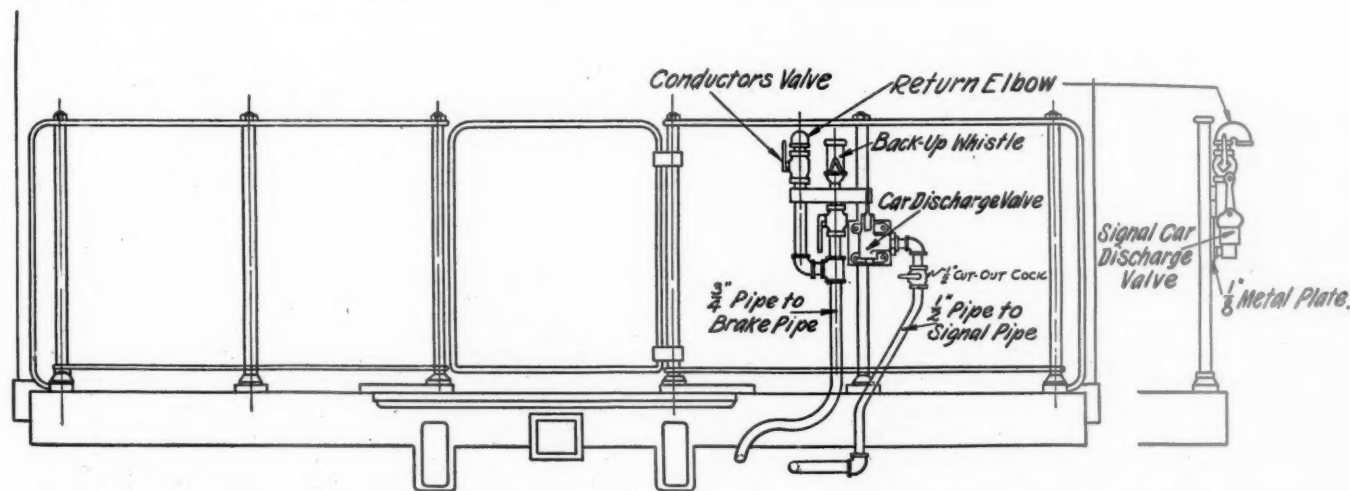
"Locate the conductor's valve and signal car discharge valve on the rear platform railing as shown in the drawing, the latter to be so located that the operating lever may be reached from the ground or from the platform.

"Attach to the branch pipe leading to the conductor's valve a suitable branch pipe equipped with operating valve and signal whistle, the conductor's valve to consist of a branch pipe from the main brake pipe reaching close to the top of the railing with a suitable stop cock for opening and closing the same.

"On cars equipped with sliding coupler carriers, the connection to the brake pipe and signal pipe should be made far enough forward so that the branch pipe connects to a rigid section of the brake pipe and signal pipe."

Several revisions of the test code for triple valves were recommended. A number of railroads requested that Interchange Rule 23 be modified to permit the building up of worn surfaces on brake beam heads by welding. The committee

\* Supervisor of air brakes, Atchison, Topeka & Santa Fe.



Proposed Location of the Conductor's Valve and Signal Car-Discharge Valve on Observation-Platform Cars

expressed the opinion that work of this character should not be permitted on malleable-iron brake heads, and as there were few steel brake heads in service, it recommended that no change be made in the present rule.

**Discussion.**—In the discussion of this report considerable emphasis was placed on the question of clearances for foundation-brake rigging. A motion was made to request the committee to give further study to this feature of car design and recommend minimum clearances. Some misunderstanding was evident regarding where these clearances should be measured. The motion also requested the committee to develop a design of foundation brake gear which would permit the bottom connection rod to pass through the bolster of new equipment and give greatly increased clearance. After some discussion this motion was withdrawn.

**Action.**—The report was adopted and submitted to letter ballot.

## Couplers and Draft Gears

R. L. Kleine, Chairman\*

Among the subjects covered in the report of the Committee on Couplers and Draft Gears this year are the status of approval tests of draft gears; elimination of cross key from swivel butt couplers, which has been studied by the Car Construction Committee and also by a technical committee of the coupler manufacturers; reclamation of coupler knuckles and locks, and coupler yokes.

### Draft Gears

The committee reports that the draft-gear manufacturers were advised that the specifications for approved draft gears for freight service and also the purchase specifications would become effective March 1, 1932, and were invited to file application for approval tests. Applications have been received from three manufacturers and several others have indicated their intention to follow shortly. The committee also announces that, with the co-operation of the authorities at Purdue University, the original figure of \$2,000 as the amount of deposit required to cover the cost of making the tests has been reduced to \$1,000, with the further stipulation that \$1,000 only need be deposited for each type of gear tested at the same time. The report also calls attention to the fact that the dimensions of draft gears in the specifications for approved draft gears and also in the purchase specifications have been modified and the Manual already revised to conform with the drawings of the cast-steel yokes in the supplement to the Manual.

The Committee also recommends changes in the specifications for draft-gear followers, which eliminate the physical test requirements for the material and confine the requirements to the chemical analysis, which have not been changed. Provision in the specification that followers shall be smooth forged or sawed has been eliminated to allow the use of any process of forming that will produce satisfactory edges.

A program of road tests to carry out the recommendation in the last year's report of the committee to determine the effect of draft-gear recoil in long trains and to investigate the Duryea and Alma cushioned underframes and selective-travel draft gears was submitted following last year's annual meeting. It has been found necessary to defer these tests in the interests of economy.

### Elimination of Cross Key from Swivel-Butt Coupler

During the annual meeting last year a question was raised whether an alternate standard could not be adopted, eliminating the cross key and using a solid vertical pin as a connection between the swivel-butt coupler and the vertical cast steel yoke. This question was referred back to the Committee on Couplers and Draft Gears and was also considered by the Technical Committee of the draft gear manufacturers and the Committee on Car Construction.

The manufacturers' committee cited the advantage of the cross key as a means of preventing the pulling out of the drawbar in case of yoke or swivel-pin failures, as an additional support for part of the coupler-yoke and draft-gear weight, and as an aid in preserving the correct alinement of these parts—a report unfavorable to the proposed alternate standard.

The Committee on Couplers and Draft Gears does not recommend the use of the swivel-butt coupler without the cross key for substantially the same reasons as were cited by the manufacturers' committee.

\* Assistant chief motive power, Pennsylvania.

On the other hand, it was the consensus of opinion of the Committee on Car Construction that the key is not essential and that the alternate design would be desirable, based on the experience with swivel shank couplers used on passenger cars. The coupler committee announces its intention to continue to collaborate with the car construction committee with a view to arriving at a satisfactory conclusion.

### Reclamation of Coupler Knuckles and Locks

A report of the sub-committee assigned to study the practicability of extending condemning limits of Types D and E couplers and to consider coupler reclamation was made since the last annual meeting and submitted to letter ballot. As a result of the ballot, the recommendations of the committee were adopted, effective May 1, 1932. The same sub-committee was assigned a study of two special types of knuckles recommended by one of the coupler manufacturers, one identified as a repair knuckle and the other as a compensating knuckle. The adoption by the association of the committee's recommendations on knuckle reclaiming processes has made it unnecessary for the committee to proceed further with its program of knuckle reclamation tests and has automatically discontinued further consideration of the special repair knuckle.

Owing to the adoption of the Type E coupler, it was jointly decided by the Mechanical Division sub-committee and the sub-committee of the coupler manufacturers that it would be unnecessary to continue a study of the Type D compensating knuckle, but that it would be worth while to make a study with reference to the Type E compensating knuckles in the Type E bars.

The committee reports the coupler manufacturers as having introduced suggestions for a change in the contour line of couplers intended to improve the service operation of the couplers and that a program of laboratory and service tests has been outlined.

### Coupler Yokes

It is the opinion of the Committee on Couplers and Draft Gears that the wrought-iron riveted yoke shown in Section C of the Manual is an obsolete type of construction and its substitution for cast-steel yokes should not be permitted. The Manual is to be revised to confine this yoke to repairs in kind where standard on existing cars. The Committee also is of the opinion that standard keyed yokes should be permitted in replacing any non-standard or riveted yokes without constituting improper repairs. The Committee recommends that the specifications for coupler yokes now recommended practice be advanced to standard.

**Action.**—The report was accepted and submitted to letter ballot.

## Report on Car Construction

P. W. Kiefer, Chairman\*

The report for last year stated that a number of questions had been raised regarding information submitted by certain roads in reply to the Engineering Division questionnaire on maximum outline to which cars having enlarged dimensions could be operated in general interchange and consequently that a recheck of the entire matter was found necessary. Owing to present conditions a further study of this matter is held in abeyance.

A change in the situation with respect to the question of car design has taken place since the last meeting. Shortly thereafter a definite program was formulated for the production of a new design of steel-sheathed wood-lined box car for general interchange service. In the report for this year drawings showing the complete design, together with a specification and descriptive analysis of the work were submitted. The committee emphasized that roads finding it necessary or desirable to provide box cars of larger dimensions for restricted use, may follow substantially the base design as shown at some saving in weight as compared with previous constructions of this general type. In view of the changed situation, the committee suggested that the outcome of the operating clearance check need not interfere for some time to come with freight-car standardization work, provided the new design of box car and the program under which it was produced are accepted by the association.

The committee reported that there have been no further developments on the single-sheathed, double-sheathed and composite auto car designs since last year as the matter of increased clearance outline is still undecided and as the newly

\* Chief engineer motive power and rolling stock, New York Central.



proposed steel-sheathed wood-lined design may influence the present single-sheathed as well as the double-sheathed composite box and automobile car.

### Center-Plate Height

In the report for 1931 the committee stated that although it is entirely practicable from mechanical and operating standpoints to design trucks of 40-, 50- and 70-ton nominal capacities having a center plate height of  $1\frac{1}{4}$  in. less than the present standard, no reduction therein appeared advisable.

When formulating the program for the new steel-sheathed wood-lined box car it was decided that in order to obtain the best results the design should be considered as a whole and that in the event any existing A.R.A. design standards, except wheels, axles and related parts, were found to have an adverse effect they would not be used. It has been determined that a center plate height of  $25\frac{3}{4}$  in. would best meet the requirements when using either 40- or 50-ton trucks and this dimension has been incorporated in the new design.

### Truck Springs

As a result of considerable development work undertaken during the past two or three years, experimental designs of truck springs have been placed under 50- and 70-ton cars with the idea of providing springs of conventional design but having considerably more capacity than the A.R.A. standard designs. These springs make available conventional designs of coil springs of sufficient capacities to meet present-day maximum loading and service conditions. In 1930 the sub-committee on truck springs was instructed to produce designs of plain carbon-steel helical springs manufactured to meet A.R.A. material specifications to meet present-day requirements and to interchange in the space occupied by the A.R.A. spring groups, also to incorporate necessary improvements in spring-plate design. The sub-committee has prepared and submitted with this year's report such designs for the 40-, 50- and 70-ton trucks. For convenience present designations C, D and H, respectively, have been used. Included in the report are drawings of the proposed spring designs together with a statement of comparative design and capacity characteristics. The solid capacities are, respectively, 77,760 lb., 89,932 lb. and 112,415 lb.

The committee recommended that new designs C, D and H be submitted to letter ballot for adoption as recommended practice for use in place of springs C, D and H now in the Manual, that tentative standard designs L, M, N, O and P be withdrawn therefrom, and that the Committee on Specifications and Tests for Materials be instructed to work up a complete processing specification for coil springs and assembled nests.

### Journal Boxes and Lids

Objections were raised by manufacturers to the 1930 recommendations of the committee to the small beveled ledge along the top edge of the journal box. The report included a sketch showing a flat top surface  $\frac{3}{8}$  in. wide adjacent to the front edge of the box with a recess provided in the front face of the hinge lug for the top lip projection as specified in the standard lid specifications. The sketch also showed a drain depression in the top of separately cast journal boxes to assist in preventing dirt or foreign matter being washed into boxes of this design. The changes shown in the sketch are recommended as standard practice for journal boxes, C, D, E and F. Further recommendations for changes in the journal-box lid specifications include the thickness and carbon content of the material; cutting away the central portion of the lip to provide clearance at the hinge lug when applied to present boxes in repairs; the provision of integrally closed eyes on cast-iron lids; and provisions for gaging the pin holes to insure a tight fit of pressed-steel lids.

### Dimensions for Journal-Bearing Backs

After an examination of hundreds of journal bearings returned to foundries by various railroads for relining, it is felt that a practical and economical limit through the crown for relining should be fixed at  $1/16$  in. below nominal thickness. All other dimensions of the back (except the wear at the ends from contact with the journal fillet and journal collar) are fixed at  $\frac{3}{8}$  in. under or over the nominal dimensions, as experience has shown that this wear of  $\frac{3}{8}$  in. plus the additional wear encountered in further service during the life of a relined bearing, is the maximum that should be allowed and still maintain proper conditions between the bearing and all of the other truck parts.

The sub-committee submitted recommended specifications for the relining of journal-bearing backs together with minimum dimensions to be used in connection with such bearings,

and recommended a change in the manual in order to distinguish between the minimum thickness for backs of filled journal bearings and the minimum dimensions for backs of lined journal bearings recommended in the report.

The committee also recommended that Interchange Rule No. 11 be abrogated, because of the impracticability of determining the thickness of the lining and consequent inability of car repairer to state whether filled or solid bearing, and that an addition be made to Interchange Rule 19 prohibiting the application to foreign cars under any circumstances of a journal bearing having back with dimensions below the minimum or above the maximum limits specified for relining. While it is true that the car repairer would be unable to determine thickness of the back, it is felt that this restriction should be set forth as a guide in the purchase of new bearings or relining of old backs for use in foreign cars.

With these amendments to the Interchange Code, Rule 66, Section (j) would remain as the guide for the removal of journal bearings from service, and the committee suggests certain amendments to this section more clearly to indicate the causes which will be considered as sufficient for withdrawal from service.

### Designating Letters for Cars

During the past year, recommendations have been received relating to a change in the definition of the BH—horse or horse and carriage express car and request has been made for a new designating symbol and a definition to cover the Dry Ice refrigerator car. The proposed change definition of BH cars includes cars with or without stalls and with or without space left for carriage or horse equipment. The definition of the new dry-ice car is as follows: "RC—Dry Ice Refrigerator. A heavily insulated house car, without ventilation, and with cross partitions forming compartments provided with doors either in the partitions or car sides. For transportation of dry ice (Solid Carbon Dioxide)."

### Axles Equipped with Roller Bearings

The committee has investigated the axle stresses in that design of roller bearing consisting of an A.R.A. axle surrounded by a tubular axle upon which the wheels are mounted and has found that the claims of the manufacturer are justified to some extent. The secretary has advised them that the stresses in any part of the proposed axle should not exceed the A.R.A. limit of 22,000 lb. per sq. in. and that to permit stress up to 22,000 lb. per sq. in. the sub-committee finds that the standard diameter of this special axle may be reduced slightly below the A.R.A. diameter at the center of the axle.

### Box Car for Generally Unrestricted Interchange Service

Following its main report the committee presented an appendix setting forth its proposed design of a steel-sheathed wood-lined box car for generally unrestricted interchange service. In addition to a complete description of the special features of construction the appendix contains a complete set of general and detailed drawings. The plan under which it was produced was stated by the committee to provide a design which represented the latest state of the art with reference to weight, cost, construction, strength and general utility. Design standards and recommended practices pertaining to car-body construction were to be disregarded where the efficiency and value of the design as a whole would be adversely affected by their use. Provision has been made for the satisfactory applications of the principal specialties such as doors, ends and roofs. The design provides the largest car which may be moved freely in general interchange without extensive operating restrictions. It is 8 ft.  $9\frac{1}{8}$  in. wide by 9 ft. 4 in. high by 40 ft. 6 in. long inside. The design effects a reduction in weight of 2,340 lb. as compared with the previous design having a height of 8 ft. 7 in.

**Discussion.**—In presenting this part of the report, Chairman Kiefer paid high tribute to the earlier work of the Car Construction Committee in developing the original standard designs and asked that it be kept clearly in mind that no comparisons in the report were made with the thought of discrediting the results of that work.

M. J. Gormley expressed satisfaction at the progress being made by the Mechanical Division, as indicated by this report, in arriving at a single standard box car which could be universally used. He stated that in response to an inquiry by the A.R.A. to the presidents of railroads owning over 8,000 cars better than 90 per cent have approved the practicability of the proposed inside dimensions.

**Action.**—The report was accepted and submitted to letter ballot.

# Motor Transport Section

## How Should Railways Provide for Bus Substitutions?

Officers give viewpoints on relative advantages of  
direct operation or contracting for service—  
Attitude of commissions changing

**W**HETHER a railway must provide a substitute service by highway when it desires to discontinue unprofitable passenger train service, and whether it is more desirable to provide for the substitute service directly, through a subsidiary, or by means of contracts with independent bus companies, are questions upon which railway officers of substantial experience in the co-ordination of railway and highway service have divergent views. This is indicated in the replies to a questionnaire distributed by the *Railway Age* to the officers of 11 railways, a number of which have been pioneers in the substitution of bus service for unremunerative passenger train service.

Of the 11 roads the viewpoints of which are explained, 5 favor and have adopted the policy of providing for bus service through wholly-owned subsidiaries, 3 see a greater advantage in contracting for substitute bus service, and 3 find advantages in both methods and, while operating most of their buses through subsidiaries, also have contracts for substitute service in some localities.

In the case of railways which are contracting for bus service, either in every instance of bus substitutions for trains, or in some such instances, it has been found that such contracts are readily made and upon favorable terms. The basis of payment is not uniform, most roads paying for the bus service on a mileage basis, but others have contracts calling for payment on a basis of the number of days of operation, others pay a fixed rate per trip, and still others make payments at an agreed rate per passenger.

### Cost of Operation

With respect to the roads which are operating their own buses, either directly or through subsidiary companies, three state that they can operate their own buses more cheaply than they can contract for bus service, while two find that direct operation is more expensive than contract operation but pursue the policy of direct operation on account of other considerations. The cost of operating buses varies substantially among different companies and in different territories. Operating costs reported ranged from as low as 14 cents per bus-mile to as high as 35 cents per bus-mile, the average being about 22 cents per mile.

Officers replying to the questionnaire are about evenly divided in their experiences as to the necessity for a

railroad's arranging for substitute service in applying to regulatory commissions for permission to withdraw train service. About half state that in their territories substitute service must be provided, while the others indicate that they have no difficulty in taking off trains without provision for some other form of transportation. Changes in the attitude of state commissions are reported in two cases. In these instances, commissions which formerly demanded a substitute service are now more willing to permit railways to reduce train service without substitute schedules on the highways.

The questions included in our submission to the 11 railways, and the replies from their officers in detail, follow:

### Method of Operation

**Question**—In substituting buses for trains, is it your policy to operate these buses yourselves or to have them operated, where possible, by other bus lines? What advantages do you see in your policy? What disadvantages, if any?

Buses substituted for trains of the Reading are operated by the Reading Transportation Company, a subsidiary of the railway. "This policy," says E. D. Osterhout, passenger traffic manager, "gives us full control of the type and conditions of the equipment, the character of the operators, and their deportment. It also places in the hands of one general organization the matter of co-ordination, which is useful in the event of changes in schedules, publishing of time tables, etc."

"In cases where we have substituted buses for trains," says W. E. Fuller, vice-president of the Burlington Transportation Company, subsidiary of the Chicago, Burlington & Quincy, "we furnish the bus service. The advantages in so doing are complete control of the schedules, and ability to meet the requirements of co-ordination of buses with train connections. If the same results could be obtained by contracting with some other operator, there would be no objection to doing so."

The Denver & Rio Grande Western effects the substitution of buses for trains through the operation of highway vehicles by controlled but not wholly-owned subsidiaries. According to F. A. Peil, assistant to the president, this has been found advantageous because the railway can keep in close touch with both operations and avoid the possibility of duplicating service. Furthermore, the highway operation can usually be conducted at a slight profit.



A middle western railroad utilizes a subsidiary company to operate the buses which it substitutes for trains. The advantage of a railroad-owned bus substitution is found to be that the railway has control over the character of the service, it can advertise it as a co-ordinated service, it can have all employees of both companies working for the good of the joint operation, and can extend the facilities of the railway to the bus operation to meet the necessity for safety, maintenance of schedules, uninterrupted service and flexibility. This railway has found no disadvantages in the plan of operating its own buses in substitution for trains.

"We operate buses in the name of the Central of Georgia Motor Transport Company, which is a corporation owned by the Central of Georgia," says H. D. Pollard, president and general manager. "This has appeared the best plan since it enables us to control the traffic, and also since the service can be performed by us to better advantage in consideration of through business and co-ordination with train service. The disadvantage in our case is that bus rates are the same as train rates, which does not allow us to compete on a rate basis with independent companies."

An eastern railway, which has adopted both methods of substituting buses for trains, reports as follows: "Each situation must be met and decided on its own merits. In one part of our territory, we have found it advantageous to make substitutions through the medium of a subsidiary. In other instances it has been more advantageous to arrange with existing operators to perform the service, inasmuch as we had no adequate organization for handling isolated operations."

The St. Louis Southwestern provides its substitute bus service through a subsidiary, the Southwestern Transportation Company. This policy, according to L. R. Reagan, general manager of the transportation company, has the advantage of permitting complete co-ordination of the operations of the transportation company with those of the railway. No disadvantages in this plan have been discovered.

"The Union Pacific," says J. L. Haugh, vice-president and assistant to the president, "operates its own bus service throughout its territory, both for the purpose of substituting buses for train service and as a

bus business *per se*. We have a few branch lines, however, where it is more economical to contract with other bus operators already in the field, than to install a competing bus operation. The advantage in owning the bus operation is that it gives us complete control of it, and we are able to adapt it quickly to any necessary changes. There are no disadvantages."

#### Favor Contract Method

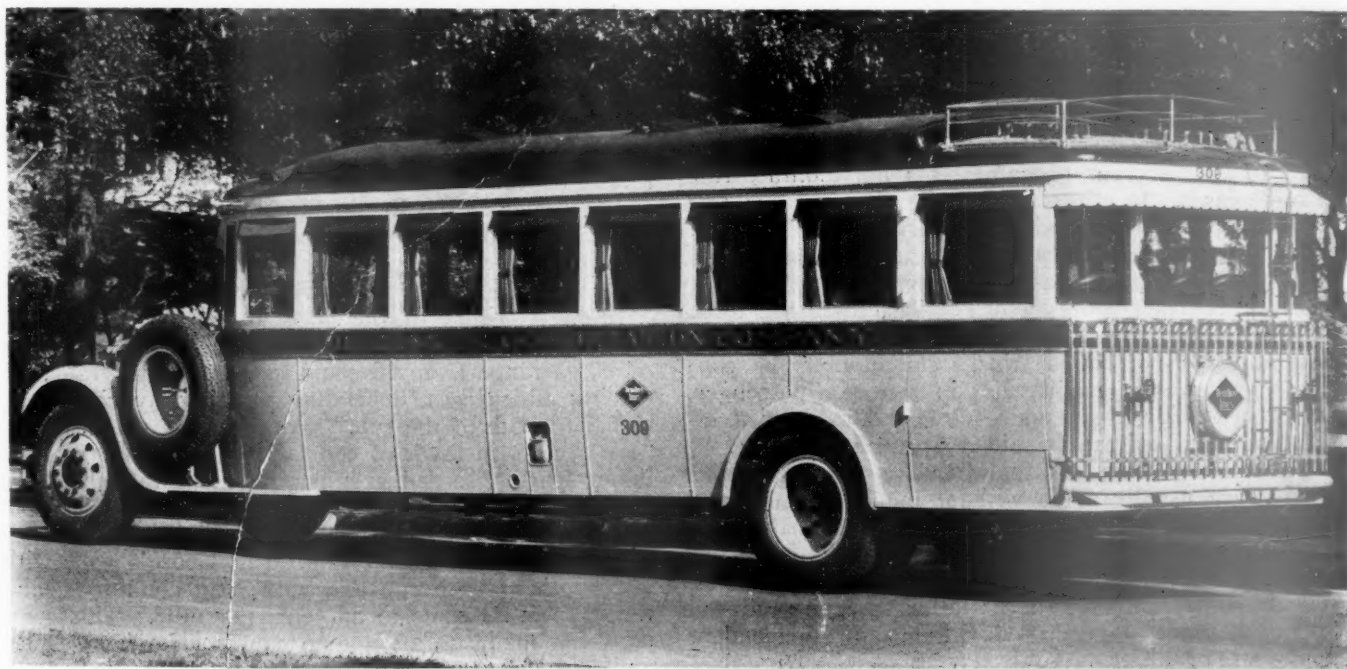
The Chicago, Milwaukee, St. Paul & Pacific operates some of its own buses and contracts for other bus service. It favors the contract method of operation. "Our bus operations are rather limited," says O. N. Harstad, general manager, "consisting of five railroad-operated buses, which we own, and four contract buses, one of which is owned by the railway but operated by a contractor. An effort is made to contract for other routes where it is necessary to establish some service because of reduction in train operation. Our limited experience indicates that it is more economical to contract for this service than to own and operate buses."

R. J. Littlefield, supervisor of motor service of the Pennsylvania, describes the policy of his company as follows: "When necessary to provide bus service to replace unprofitable trains, our policy is to have the operation handled by the bus company, regardless of ownership, which quotes the best rate, giving proper consideration to the reliability of the operator and to the type and frequency of service available. Generally speaking, a local bus operator is well equipped to meet local conditions, and to co-ordinate a rail replacement service with other bus services, in a manner which is advantageous to the public, to the railroad and to himself."

"The Chicago & North Western does not operate its substitute bus service," says Frank Walters, vice-president. "When possible to withdraw unprofitable steam trains, arrangements are made with outside bus lines to furnish bus service to satisfy communities from which service is withdrawn."

#### Contracts for Bus Service

Question—If you contract for bus service, is it your experience that such contracts are readily made and upon favor-



On the Reading, All Train-Substitution Buses Are Operated by a Subsidiary of the Railway



In Addition to Its Large Fleet of Subsidiary-Owned Buses, the Union Pacific Has Contracts for a Few

able terms? What is the basis of payment to the contract bus operator? Is there a mileage guarantee?

One road which has a few contract bus operations says, "Where we have contracted for bus service, our experience has been that there is little difficulty in making such contracts, and the terms are as favorable as could be expected. In one case we made the basis of payment to the contract bus operator a flat mileage rate, the railroad to receive all the revenue. In another case we made a contract on the basis of a flat rate per day, the railroad in this case also retaining all revenues. It is understood, of course, that these revenues accrue through the railroad tickets taken up by the bus operator."

The Southwestern Transportation Company, which has one or two contract bus lines, has found that these contracts are easily made and upon very satisfactory terms. The operators with which the Southwestern has contracts are paid on a mileage basis.

The Union Pacific has found that in some instances it can make satisfactory contracts on favorable terms for branch line substitute service. The basis of payment to contract bus operators is a flat monthly rate in some cases. In others it is a mileage guarantee, and in others payment is made on a passenger-mile basis.

The Milwaukee has had no difficulty in contracting for bus service upon reasonably favorable terms. On the four contract routes which it has, there are three different bases of payment. On one route a flat rate is paid for three round trips. On another the contractor receives a graduated trip rate per passenger, based on station-to-station service, and in a third instance a stipulated rate is paid per revenue bus-mile.

The Pennsylvania has found that contracts for bus service are usually made without much difficulty and upon favorable terms. Payments are customarily made on a flat rate per bus-mile, on a cost-plus basis, or under a plan whereby the operator retains all revenues for his compensation. In the latter case, the railroad may or may not guarantee a minimum return, dependent upon local conditions.

The North Western reports no difficulty in making

favorable contracts for bus service. Its contractors are paid a stated amount for the service and also a percentage of the revenues from the tickets collected.

The officer of one road, which does not contract for bus service, states, "It is my information that our own bus operating costs are about 33 per cent less than those for which contracts are ordinarily made with other bus lines to provide buses in substitution for railway service. Such contracts as I have seen or have been advised of are made upon a mileage guarantee, usually about 30 cents per mile."

#### Considerations Dictating Direct Operation

Question—If you operate your own buses, what do you find the operating cost to be? In your territory, could you contract for bus service more cheaply? If so, what considerations outweigh the economy and cause you to operate your own buses?

The Reading believes that direct operation is more economical than to contract for bus service. Mr. Osterhout says, "On the assumption that we can operate a given standard of service as cheaply as anyone else, we save the profit which the outside operator naturally expects."

Mr. Fuller of the Burlington says, "Our operation is costing us around 18 cents per bus-mile. Not having attempted to contract for bus service, I cannot answer as to what the cost of that would be."

In the territory of the D. & R. G. W., responsible contractors are not always available. "Operating costs of buses range from 18 cents to 25 cents per mile, including all charges, depending on highway conditions and the length of the run," says Mr. Peil, of this road. "We are not in favor of contracting for bus service, as in our sparsely settled territory there is always the question of securing thoroughly responsible and reliable operators."

Operating costs on the Central of Georgia vary with the length of each run and with road conditions, and range from 22 cents to 35 cents per mile. This company has made no attempt to contract for bus service and, therefore, makes no comparison.

An eastern railroad, with a bus operating cost of 21



cents per mile, including interest, depreciation, taxes and all charges, finds that in its territory it cannot contract for bus service at a rate lower than that.

L. R. Reagan of the Southwestern Transportation Company says, "Bus service could probably be contracted for at a rate less than the cost of operating our own buses, but we could not get a contractor to operate our service to the satisfaction of ourselves or to the satisfaction of the St. Louis Southwestern. The transportation company must operate efficiently and coordinate its operations so as to maintain the service and standards of the railway."

#### Location of Line a Factor

There are times when contracting is better than direct operation, and vice versa, in the judgment of the Union Pacific. "The operating cost of our entire bus operation, including depreciation, is about 28 cents per mile," says Mr. Haugh. "However, this varies for branch line substitute service, depending entirely upon the location of the branch with respect to service points of the bus line. If a new service point must be installed and the daily mileage is small, the cost of operation on a line is high. However, if the substitute service is operated out of an existing service point, and the daily mileage is sufficient to occupy the full time of a driver, the cost is small. In case there is an existing operator who has a conveniently located service point, and we do not have one on the branch line where the substitute service is desired, we can contract for the substitute service more cheaply than we can install it. While it is really more satisfactory to have our own service, because it is flexible and can be adapted to the rail schedules, yet we give consideration to the economy feature."

An exceptionally low operating cost is reported by the Milwaukee. Mr. Harstad says, "For the year 1931, the operating cost, on the buses owned by us, was 14.5 cents per revenue bus-mile. The cost to us for operating contract lines is somewhat under that figure and, therefore, more economical; but having invested in several buses, it is necessary for us to keep them in service so long as they are in condition to operate and can give satisfactory performance."

The officer in charge of the bus operations of a western railway says, "This company operates its own buses and the average cost of operation is approximately 20 cents per mile. We might be able to contract for portions of our substitute service for a guarantee of 20 cents per bus-mile, but we believe there are many advantages in operating our own service, and so long as we can operate the service as cheaply, or more cheaply, than we can contract for it, there is no reason for contracting for service."

#### Necessity for Substitute Service

Question—Is it your experience that bus service must be provided in order to get permission to take trains off, or do the regulatory commissions permit trains to be taken off when no substitute service is offered?

In response to this question, Mr. Osterhout of the Reading says, "It frequently would be difficult, if not impossible, in our territory to remove local trains without substituting buses. We always have the matter of school children, workmen at heavy-tonnage industries, etc., whose inconvenience might be reflected in other items of revenue if they were left without the transportation service needed by them."

The Burlington has found that substitute service need not be provided. Mr. Fuller says, "It has not been our experience that bus service must be provided in order

to take off trains, and we have been permitted to take off passenger train service without offering a substitute service of any kind."

A similar experience is reported by Mr. Littlefield of the Pennsylvania who says, "Generally speaking, it is not necessary to provide bus service to replace unprofitable trains."

Mr. Walters of the Chicago & North Western says, "State commissions permit the withdrawal of unprofitable passenger service, but usually hold to the requirement that at least one passenger train in each direction must be operated daily except Sunday."

The necessity of providing bus service in their territories, when trains are taken off, is reported by the Denver & Rio Grande Western, the St. Louis Southwestern and the Union Pacific. Mr. Hall of the last road says, "We have found in many instances that where we seek permission to take off trains, it is necessary to provide bus service in its place in order to get the approval of the state commission. Then, after operating the bus service for a sufficient length of time to demonstrate the small earnings, we can get the approval of the commission to abandon the bus service."

Mr. Harstad of the Milwaukee says, "Regulatory commissions generally require a substitute service when permission is given to discontinue train service, but there are instances where bus lines have already established such service and it would be unwise to duplicate it. The conditions surrounding each particular case of train-service reduction or abandonment are generally the basis of the decision."

#### Attitude of Commissions Changing

Mr. Pollard of the Central of Georgia reports a change in the attitude of regulatory commissions in the territory of his railway. He says, "All of our buses were put on in order to discontinue train service during the years 1928-31. The regulatory commissions at that time insisted that some service be performed in place of train service. In the last eight or nine months, the commissions have changed their demands, and we now ask for discontinuance of train service without any substitute, and the petitions are usually granted."

The officer of an eastern railway says, "When permission is granted to take trains off, it has been our experience that the commissions seem to prefer that we give a substitute bus service through our own subsidiary."

"In other cases we have no difficulty in securing permission to remove trains where we offered no substitute, but where other independent bus companies were already operating a service in competition with us. Generally speaking, if we can make a reasonable showing that our trains are operating at a considerable loss, we can secure permission to remove them, whether we run the bus service ourselves or whether some independent runs it."

The report from a middle western road says, "In some instances, trains can be discontinued irrespective of providing bus service, upon a showing that the service could not be made to pay. In many cases trains can be taken off because other bus service is available. There is at present a sympathetic attitude on the part of most public service commissions because of the large passenger mileage operated at a loss by the railroads. However, there is a policy question involved in every instance, as to whether communities should be left without public transportation, or whether a cheaper form of transportation, such as bus service, should be provided to take care of the travellers who prefer not to ride in automobiles. Our company has proceeded on

the theory that a co-ordinated rail and highway transportation, under common ownership, can eventually restore much passenger traffic to the common carriers, preserving compensatory rates and maintaining a class of service best suited to the public requirements."

## General Motors Has New Two-Three Ton Truck

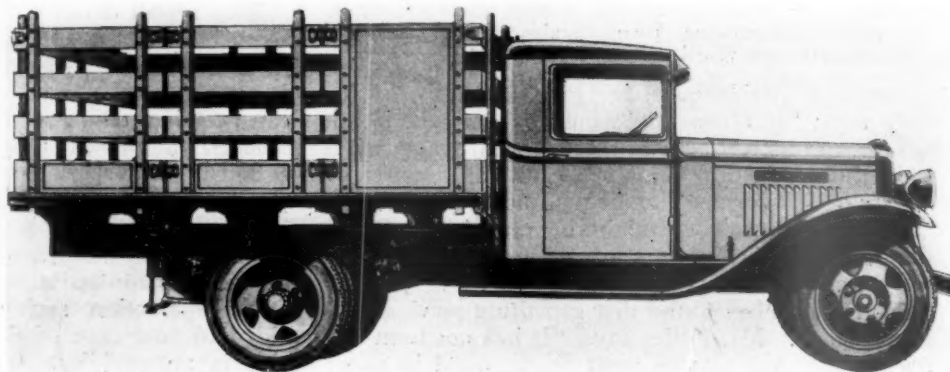
**T**HE newest addition to the line of motor trucks manufactured by the General Motors Truck Company, Pontiac, Mich., is a 2- to 3-ton truck, powered with a 66-hp., 6-cylinder engine and available in wheelbases of 131 in. and 157 in. The new truck is known as Model T-23. Featuring a full floating rear axle and main and auxiliary rear springs, the truck is offered with 10 body types. The "straight rating" of this model is 10,000 lb., and when it is used as a tractor, the payload capacity can be practically doubled.

The engine has a counterbalanced crankshaft equipped with a harmonic balancer to prevent engine vibration. A full-pressure lubrication system is provided, including rifle-drilled connecting rods. The drive is through a heavy-duty transmission, with four speeds forward, tubular propeller shafts and a full-floating rear axle. The front springs are fitted with snubber leaves and self-adjusting shackles, while the rear springs are of the two-stage type, main and auxiliary, to accommodate both heavy and light loads.

The wheels are of the drop forged, "spoksteel," five-stud type, with dual wheels at the rear as standard equipment. The standard tires are of the 6.50-20 size and these are used on all wheels, but other tire sizes are available at additional cost. Through the fan action of the blade-shaped spokes, both tires and brakes are cooled continuously, while the cone lock nuts keep the wheels in alinement.

The body types for the 131-in. wheelbase and the 157-in. wheelbase models include the following: Platform bodies, with load spaces 109 in. and 145 in. long, and 87 in. wide; standard stake and standard stake express bodies, with load spaces 105½ in. and 141½ in. long, 81½ in. wide and 42 in. high; a high rack body, with load spaces 104½ in. and 141½ in. long, 81½ in. wide and carrying a rack 60 in. high on the 131-in. wheelbase and 66 in. high on the 157-in. wheelbase; an express body with load spaces 106 in. and 142 in. in length, 60 in. in width and 16-in. sides. A special stake body, for the 131-in. wheelbase model only, provides a load space 106 in. long, 75 in. wide, with stakes 30 in. high.

General Motors  
Truck Model T-23



## White Offers 1 ½-Ton Six-Cylinder Indiana Truck

**A**N oversize 1½-ton, 6-cylinder Indiana motor truck, powered with a 68-hp. engine and having an allowable gross weight of 10,000 lb., is being offered by the White Company, Cleveland, Ohio, which sells and services Indiana trucks. Five wheelbases and an extensive line of bodies are available. In addition to the standard wheelbase of 141 in., there is an optional wheelbase at no extra cost of 132 in., and optional wheelbases at extra cost of 155 in., 169 in. and 186 in.

The 6-cylinder Hercules engine employed has a bore of 3⅝ in. and a stroke of 4¼ in., giving a piston displacement of 263 cu. in. The S.A.E. rating is 31.54 hp., while the engine develops 68 brake hp. at 2800 r.p.m. The torque at 1000 r.p.m. is 160 ft. lb. Features of the engine are a seven-bearing crankshaft, force-feed lubrication to main connecting-rod, and camshaft bearings and timing gears, a centrifugal pump cooling system, and a down-draft carburetor.

The clutch is a 12-in. single plate of Brown-Lipe manufacture, and the Brown-Lipe transmission is of the 4-speed selective sliding gear type, mounted in unit with the motor.

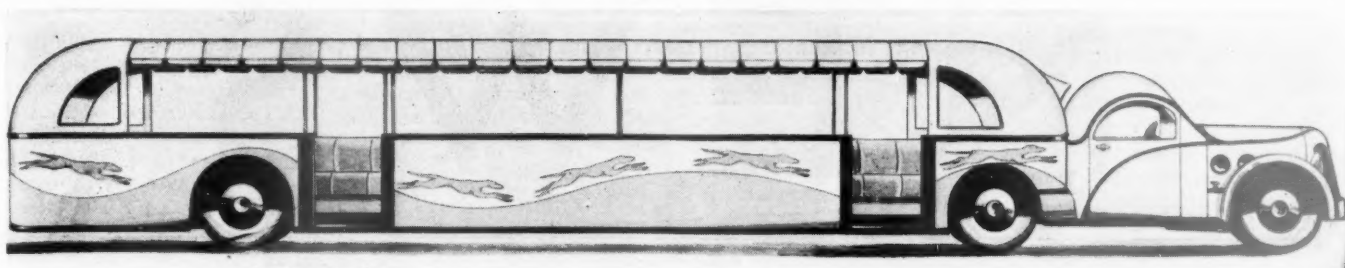
Timken axles are provided at both front and rear, the latter having a single-reduction type of drive and full floating wheel mounting.

The main members of the frame are pressed-steel channels with five cross members. The springs, both front and rear, are of the semi-elliptic type and consist of 11 leaves. The steering gear is of the Ross cam-and-lever type. These trucks employ 4-wheel hydraulic, internal expanding service brakes, which have a lining area of 249 sq. in. The emergency brake operates on the propeller shaft at the transmission, and has a drum 6 in. in diameter. The wheels are of the Budd ventilated disc type and Firestone rims are applied.

Distances from the back of the seat to the center of the rear axle on the various wheelbases range from 3 ft. 11 in. to 8 ft. 5 in. Distances from the back of the seat to the end of the frame range from 7 ft. 8 in. to 11 ft. 8 in. The chassis weight is 3,900 lb.

CAPTAIN JAMES B. DICKSON arrived in Los Angeles, Cal., on the evening of June 16, before dark, completing an airplane trip from Newark, New Jersey, which was begun at 5:52 a. m. (long after sunrise) of the same day. This distance—about 2500 miles—is claimed to be the greatest ever flown between sunrise and sunset. Captain Dickson carried three passengers, and the elapsed time is reported as 16 hours, 49 minutes. This included two hours consumed in stops at Indianapolis, Indiana; Wichita, Kansas; and Albuquerque, New Mexico.





Design of Tractor and Semi-Trailer Buses to Furnish Transportation at Chicago World's Fair

## Greyhound to Operate Special Buses at Chicago Fair

**A** FLEET of specially-designed motor buses, employing the tractor and semi-trailer principle, will be operated by the Greyhound Corporation to provide the principal intra-fair transportation during Chicago's 1933 "Century of Progress" World's Fair. The special equipment will be furnished by the General Motors Truck Company, and a contract providing for the \$500,000 bus transportation system has been signed by officers of the Greyhound Corporation and the Century of Progress Exposition.

The equipment itself is designed along highly original lines, and will be painted in colors to correspond with the general vivid color scheme of the exposition buildings.

Each transportation unit will have a longitudinal seating arrangement with a capacity of 90 passengers. The buses will be open at the top and sides except during inclement weather, when curtains and temporary overhead protection will be provided. The fleet of buses will include 60 units, each 45 ft. long, and will be able to handle 15,000 to 20,000 passengers per hour, schedules calling for operation during 14 hrs. a day. Two of the units will be placed in operation on the exposition grounds this summer in order to provide for tests of the seating arrangements and other new features.

Because of the extreme length of the fair grounds, the fleet will be operated in two groups. One will be on a high-speed schedule, covering a through arterial route, and the other will be on sight-seeing routes and will operate on slow schedules. The high-speed line will be operated from the north entrance of the fair grounds to the Travel and Transport building near the southern extremity of the area. Between the north and south terminals there will be seven stations, where passengers may board or leave the express buses. These buses will have an average speed of 15 miles an hour. The slow-speed route will circle the grounds and will provide for an average speed of 4 to 8 miles an hour.

The Greyhound Corporation will assign approximately 300 employees to handle the work involved. Each transportation unit will be manned by a driver and a conductor, two shifts being worked daily. In addition to the drivers and conductors, a number of cashiers and other attendants will be necessary.

The tractor and semi-trailer system of transportation was decided upon because of its flexibility and its ability to meet the rapidly fluctuating conditions of exposition traffic. The routings and the number of units employed may be changed on short notice, so that the system can be adapted to meet the traffic demands in connection with large special events which will be held in different parts of the grounds.

## British Roads' Profit from Bus Investments

**B** RITISH railways, while proceeding to install their own motor trucks in the development of co-ordinated freight services, have, generally speaking, co-ordinated rail and highway passenger services through working agreements with formerly-independent bus-operating companies in which the railways have acquired substantial financial interests. The extent of these interests is revealed in the railway's 1931 annual reports, the bus line investment statistics of which were published in a recent article in the *Railway Gazette* (London).

The figures reveal that the four group railways, as of December 31, 1931, had a combined investment of approximately £9,000,000, or \$43,830,000 (pounds converted at par) in highway passenger service operations. The largest investor is the London, Midland & Scottish with an investment of £2,937,380 in 17 bus companies. Next is the Great Western with an investment of £2,263,985 in seven companies, while the London & North Eastern has invested £2,251,801 in 15 companies, and the Southern £1,384,801 in 10 companies.

During 1931 the L. M. S. received on its bus company securities dividends totaling £190,555; the Great western received £66,959, and the L. N. E., £144,495. Since the set-up of these investments in the Southern's accounts is different, the dividends received by that road are not listed, but it is stated that the 1931 return amounted to 5½ per cent. The above-mentioned dividends received by the L. M. S. and L. N. E. amount to approximately seven per cent on their respective investments, while the Great Western return is about three per cent. Commenting upon these dividends, the *Gazette* suggests that they "do not entirely reflect the actual return enjoyed by the railroad companies on their investments for the reason that the investments have not in all cases been held for a complete year and also on account of the varying dates upon which the fiscal years of the bus companies end."

THE INTERSTATE COMMERCE COMMISSION has ordered an investigation into the propriety and lawfulness of tariffs filed by the Missouri Pacific and the St. Louis Southwestern which provide that those carriers will absorb drayage or trucking charges on carload shipments not in bulk and less-than-carload shipments aggregating 6,000 pounds or more per car for transfer between their tracks and industries situated on and served by industrial sidetracks of other railroads, and between their tracks and platforms, docks or doorways of all shippers and consignees in certain named cities and towns in Arkansas and Missouri. The case has been assigned for hearing on July 15 at Little Rock, Ark., and July 18 at St. Louis, Mo., before Examiner Taylor.

# NEWS

## Deciduous Fruit Rate Complaint Dismissed

I.C.C. reverses itself in case involving interpretation of Hoch-Smith resolution

Reversing its decision of five years ago, when it ordered a reduction in the rates on deciduous fruits other than apples from California to transcontinental destinations under an interpretation of the Hoch-Smith resolution which the Supreme Court of the United States later held to be erroneous, the Interstate Commerce Commission on June 20 made public a report on further hearing dismissing the complaint of the California Growers' & Shippers' Protective League with a finding that the rates are not unreasonable. This is the finding the commission had also made in 1925 on a complaint filed before the passage of the resolution. After the court had held the order of 1927 invalid, on the ground that the Hoch-Smith resolution required no changes in rates otherwise reasonable and lawful under the interstate commerce act, the commission re-opened the case for rehearing, together with a case involving a complaint filed by the state commissions of northwestern states against the rates on apples and other deciduous fruits from the Pacific northwest. The complaints were allowed to be amended by eliminating any reference to the Hoch-Smith resolution and further hearings have been accorded on the narrowed issues.

On the northwestern complaint the commission now finds that the present rates are not unreasonable except to the extent that rates on deciduous fruits other than apples exceed \$1.73, which is the rate from California points and which the commission prescribes as a reasonable maximum for the future. This reduces the rate of \$1.875 from Washington, Oregon and Idaho to the East. In the California case under the resolution the commission had reduced that rate to \$1.60 and had reduced a rate of \$1.62 to certain destinations to \$1.50.

In the report on rehearing Commissioner Aitchison says that the record indicates that during the time covered thereby, up to the early part of 1930, the rates on the traffic involved "have been well remunerative" and that "if we should or could take past normal cost of service as the test, some reduction in the rates could be made"; but "cost of service is not and in the present emergency conditions could not well be made the sole test." "The record speaks in the past," the report continues, "and of conditions

greatly different from those which now surround the carriers and growers. There have been changes in all the basic factors—the amount of traffic, the cost of supplies, wages, the credit conditions of the carriers—which enter into the cost-of-service estimates; but while we know material changes of consequence have occurred, they cannot be translated into amounts by which we can adjust the past cost-of-service estimates to reflect either the present or the conditions of the immediate future so far as they may be so projected from a consideration of the immediate circumstances. We must take notice of the general fact of the decline in the volume of traffic, affecting commodities generally; and of the familiar principle which operates in such circumstances to increase the cost per unit of performance of those items of outlay which are fixed and do not vary with traffic. In the aggregate these changes, while to a certain extent counterbalancing, will make for much greater present day unit costs for service than those indicated of record. The cost of service estimates before us we can not rely upon for the present, or for any reasonable future period now in sight, without further examination and correction, which none of the parties seem to desire.

"Necessarily our findings are based upon the record before us. They neither preclude a reexamination of the question in normal circumstances, nor upon a record which shows adequately the effect of the present conditions. Nor is any adjustment precluded which the negotiations of the parties may suggest to be necessary or desirable in their mutual interest, or to meet competitive conditions, or otherwise in the exercise of sound managerial discretion."

Commissioner Mahaffie, concurring in part, said that the record affords no adequate proof to support the conclusion that the \$1.73 rate is a maximum reasonable rate; "such a guess is not supported by the facts as to the present grave inadequacy of revenues of the carriers handling this traffic."

### Lower Rates Asked for Fresh Fruits

The California Growers' & Shippers' Protective League has requested the transcontinental railroads and their connecting lines to grant an emergency freight rate on fresh fruits and grapes to eastern markets, the rate not to exceed \$1.44 per 100 lb., as compared with the present rate of \$1.73. It is contended that a real and vital necessity now exists for an immediate lowering of the rates, since present indications are that market prices this year will be even lower than in 1930 and 1931.

## Harriman Safety Medals Awarded

Chicago & North Western, Ann Arbor and Green Bay & Western win in classes A, B and C

The E. H. Harriman Memorial Medals for the year 1931 were awarded by the American Museum of Safety at a luncheon at the Union League Club in New York on Monday, June 20, Arthur Williams, president of the Museum, acting as chairman.

The gold medal, the Group A award, was presented to the Chicago & North Western Railway and was received by General Manager G. B. Vilas. Thirty-seven class 1 railroads competed for this medal. The Chicago & North Western unit of the North Western System effected a reduction of 57.3 per cent, as compared with its 1930 contest rate, and stands credited with having operated 690,292,000 passenger-miles without a passenger fatality in train or train service accidents. The employee fatalities were reduced from 14 in 1930 to 6 in 1931, a reduction of 57.1 per cent.

The silver medal, Group B award, was awarded to the Ann Arbor Railroad Company, and was received for the railroad by General Manager G. H. Sido. Sixty-seven railroads, each operating between one million and ten million locomotive-miles, competed for this award. The Ann Arbor had a clear fatality record for both passengers and employees and there were only three employee reportable injuries for the year 1931. It is interesting to note that this railroad ranked thirty-fourth in its group in 1928, seventeenth in 1929, fifth in 1930, and first in 1931, effecting a reduction in weighted rate for 1931 of 60.8 per cent, as compared to 1930.

The bronze medal, Group C award, was given to the Green Bay & Western Railroad Company, and was received by Robert Winthrop, assistant secretary of that company. Forty-six railroads, each operating less than one million locomotive-miles were entered in this group. The Green Bay & Western ranked third in 1930, but effected a 78.7 per cent reduction in 1931, with a clear fatality record for both years, and employee injuries reduced to one for the year 1931.

### R. H. Aishton Honored

President Williams of the American Museum of Safety, sprang a surprise on President Aishton of the American Railway Association, when near the conclusion of the luncheon, P. E. Crowley, former president of the New York Central Lines,



was called upon to present a certificate of special commendation to Mr. Aishton in recognition of more than fifty years of active and co-operative participation in the promotion of railway operating safety. This certificate notes the high points in Mr. Aishton's career and includes this citation: "In a fashion peculiarly and forcefully his own, he has served as the general directing the forces battling on all fronts to make rail transportation safe for passengers and for employees."

In acknowledging this honor, Mr. Aishton modestly passed the credit for the record on to the great army of railway officers and employees, who have co-operated so enthusiastically and loyally in the safety campaigns. He made particular mention of Ralph C. Richards, formerly general claim agent of the Chicago & North Western, who originated the safety movement and aggressively promoted it for many, many years.

#### Gratifying Reduction in Accidents

Mr. Williams in a short address before the presentation of the medals, called attention to the fact that fewer passengers were killed and fewer passengers were injured in 1931 than in any year since complete records became available in 1888. Forty passengers lost their lives in train and train service accidents in 1931, compared with 50 such fatalities in 1930 and 200 in 1922. Non-fatal injuries to passengers in 1931 numbered 2,102, compared with 2,665 in 1930 and 6,153 in 1922.

In 1931 the passenger casualties averaged 548 million passenger-miles for each fatality. This compares with 538 million passenger-miles in 1930 and 179 million in 1922. On the basis of the 1931 record, railway passengers traveled the equivalent of more than 20,000 trips around the world for each fatality recorded.

Fewer employee fatalities were reported for 1931 than for any year on record. Fatalities to employees on duty numbered 644 in 1931, compared with 935 in 1930 and 1,657 in 1922. Non-fatal injuries totaled 22,954 in 1931, compared with 35,325 in 1930 and 117,197 in 1922. In 1922 one out of 1,003 employees in service was killed and one out of every 14 employees was injured. In 1931, one out of every 1,907 employees was killed and one out of every 55 was injured.

For the third consecutive year the number of fatalities in highway grade crossing accidents declined. There were 1,811 fatalities and 4,657 non-fatal injuries at highway grade crossings in 1931. In 1930 there were 2,020 fatalities and 5,517 non-fatal injuries.

On motion by James Speyer, a telegram of appreciation was sent to Mrs. Harriman, who could not be present. Mr. Speyer and Dr. John H. Finley, editor of the New York Times, both made appropriate impromptu addresses. Among the special guests were Y. Yamamoto and S. Miyake of the Japanese Government Railways, which also take a large interest in the safety problem.

The committee in charge of the E. H.

Harriman Memorial Medals includes Arthur Williams, chairman; Samuel O. Dunn, editor, *Railway Age*; Frank McManamy of the Interstate Commerce Commission; Lew R. Palmer of the Equitable Life Assurance Society, and Charles M. Schwab. F. D. Underwood co-operates as advisor to the committee on behalf of Mrs. E. H. Harriman.

#### Reduced Week-end Fares on New Haven

The New York, New Haven & Hartford on June 24 introduced reduced week-end fares for round trips from New York. The New Haven plan is similar to that previously inaugurated on other eastern roads and involves the sale of reduced-rate tickets which are accepted for the outbound journey from New York from 12 noon Friday to midnight Saturday and for the return trip on the following Sunday or Monday.

The reduced fares apply from Grand Central terminal or 125th street, New York, to all points on the New Haven and also to points on the Boston & Albany east of Springfield, Mass. They will also be accepted in Pullman cars upon payment of the regular charges but will not be good on the New Haven's extra fare trains—the Knickerbocker Limited, the Yankee Clipper and the Merchants Limited.

#### Plans Complete for New York Railroad Club Outing

Arrangement of a program in keeping with the times—to provide a high class time at a small outlay—has been the announced purpose of the committee in charge of the New York Railroad Club's

#### Our Crumbling Highways

Announcement by the highway department of the completion of two new bridges on highways leading into Wilkes county, to replace bridges which collapsed under the weight of heavy trucks, is a warning to the people of the state of what is happening to the highways on which more tax money is being expended than for all other purposes of the state government combined.

\* \* \*

The destruction of these two bridges on highways of one county gives a picture of what is happening to all the highways of the state.

We are spending millions of dollars each year for the construction of paved roads and permitting them to be wrecked at the rate of as many millions by overloaded trucks.

Our regulations are not sufficient and those we have are not being enforced. If the present condition continues, before the plan of webbing the state with paved highways is completed it will be necessary to begin all over again.

—From the Atlanta (Ga.) Constitution

annual outing to be held on Wednesday, June 29, at the Westchester Country Club, Rye, N. Y. As outlined in the *Railway Age* of June 11, the program will include golf events, and field sports for non-golfers or, as the announcement states, members and their guests "are cordially invited to enjoy the privilege and pleasure of a day at golf, tennis, swimming, etc."

Golf events, for which prizes will be awarded, will include the regular annual tournament, the third annual open team championship and driving and putting contests. Field events for non-golfers will include quoits and driving and putting contests. Dinner will be served at 7:30 p.m.

#### Railways Willing to Co-Operate in Studies of Six-Hour Day

Committees representing the eastern, southern, and western railways, at an informal conference with Division 6 of the Interstate Commerce Commission on June 16, expressed their willingness to "co-operate in any field studies the commission desires to make" as to the effect of the application of the six-hour day principle in railway employment; but further stated that they were "not willing to put into effect a six-hour day on their respective railroads; that the individual carriers have been taking active and energetic steps to spread available work among the largest number of employees and that they are proposing to continue co-operative efforts with any employees, or groups of employees, to that end."

This statement was made by way of reply to the tentative suggestions advanced by Commissioners Eastman and McManamy at an informal conference two weeks before. Commissioner Eastman had suggested that the investigation being made by the commission be supplemented by a study to be made by the commission through its staff on a typical operating division, in co-operation with representatives of management and labor; while Commissioner McManamy had proposed that the six-hour day be actually put into effect for a practical test to such extent as might be agreed upon between the railroads and the labor organizations. The labor leaders had indicated a preference for the McManamy plan, but had agreed to co-operate under such a plan as that suggested by Commissioner Eastman.

#### New Bus Bill Introduced in Congress

A new bill to provide for the regulation of interstate bus transportation and a permit system for trucks was introduced in Congress on June 21 by Chairman Rayburn of the House committee on interstate and foreign commerce for what he said might be termed "educational purposes," so that it may be studied by those interested parties before the next session of Congress. He said the bill was based on that introduced by Senator Couzens at the beginning of this session of Congress but with a number of substantial changes for the purpose of carrying out recommendations made by the Interstate Commerce Commission. Provisions for the regulation of railroad holding com-

panies such as had been included in the Couzens bill were not included in the Rayburn bill, as his committee has reported out a separate bill dealing with this subject. No action has been taken by the Senate committee on interstate commerce on the Couzens bill and Senator Couzens has stated in the Senate that he had been unable to obtain a quorum to consider the bill.

#### Daniel Willard Honored

Daniel Willard, president of the Baltimore & Ohio, received the honorary degree of doctor of laws from Massachusetts State College, Amhurst, Mass., on June 13, and from the University of Rochester, Rochester, N. Y., on June 20.

#### Air-Cooled Diner on Texas Special

The St. Louis-San Francisco has placed an air-cooled diner in operation as part of the Texas Special, the car being equipped with air-conditioning apparatus recently purchased from the American Car & Foundry Company.

#### A. C. L. and L. & N. Salary Reductions

Salaries of all officers and employees in supervisory positions on the Atlantic Coast Line and the Louisville & Nashville will be reduced 10 per cent on July 1. This is the second 10 per cent reduction, the previous cut having been effective January 1.

#### Pacific Northwest Shippers' Board

Reports made by commodity committees at a meeting of the Pacific Northwest shippers' advisory board at Tacoma, Wash., on June 12, indicate that car loadings during the third quarter of 1932 will total about 165,000 cars, as compared with 219,471 moved during the same period of 1931, a reduction of 24 per cent.

#### Many Respond to Burlington Offer of Garden Land

More than 500 employees and ex-employees of the Chicago, Burlington & Quincy have taken advantage of that road's offer to permit the use of land along its right of way for gardening purposes. In addition 81 persons not connected in any way with the Burlington have also been accommodated.

#### Government Competition with Business

Bird M. Robinson, president of the American Short Line Railroad Association, testified before the special House committee investigating government competition with private business at Washington on June 15 and asked the committee to make a "thorough and exhaustive investigation of the use of the highways by commercial buses and trucks under existing unfair conditions" as well as the "activities of the government with respect to waterways and especially with respect to the Inland Waterways Corporation." The short lines, he said, have suffered more than any other transportation agency from unregulated competition on the high-

ways. He pointed out that from 1920 to 1930 a total of 7,214 miles of short line railroads had been abandoned. The committee is planning to continue its hearings at various points throughout the country during the summer recess of Congress.

B. E. Dwinell general attorney of the Chicago, Rock Island & Pacific, testified before the committee on June 21, urging the committee to recommend legislation that would take the government out of the barge line business. He asked that a time be set when the railroads may appear before the committee and present detailed evidence to show that such competition is unfair and unnecessary.

#### D. & H. Wage Agreement

The Delaware & Hudson has reached an agreement with its firemen and enginemen establishing wages of these employees on a straight hourly basis, eliminating overtime, but calling for a minimum amount of guaranteed employment each month. Similar agreements have previously been reached with engineers and conductors of the D. & H., which road was not a party to the Chicago conferences which, early this year, resulted in a 10 per cent reduction in the wages of unionized railway employees.

#### I.C.C. Allows Time for Further Tests of Running Boards

The Interstate Commerce Commission has modified its order of November 20, 1931, in which it authorized railroads for a limited time to equip for purposes of investigation and tests a sufficient number of box cars with running boards made of material other than wood which it is believed may provide the same or a greater degree of safety than is provided by running boards made of wood. The modification permits the use of cars already equipped for such purpose until further order of the commission.

#### N. Y. C. Trains Accelerated

The Southwestern Limited of the New York Central now runs through from New York to St. Louis in 23 hr. 25 min., 35 minutes quicker than heretofore; and the Ohio State Limited, heretofore running to Cincinnati will be run through to St. Louis; leaving New York at 3:05 p.m. and running through in 23 hr. 10 min.

The Lake Shore Limited leaves New York at 7:45 p.m., 2 hr. 15 min. later than heretofore and will run through in 21 hours, arriving at Chicago the same as before, 3:45 p.m. Under the new schedule this train takes the place of the Cleveland Limited.

#### Fines for Giving Free Storage

In the United States Court at New York on June 10, a fine of \$15,000 was imposed on the Baltimore & Ohio for illegal storing of freight without collecting proper storage charges; counsel having entered a plea of guilty, for the road. There were three indictments with five counts each and the court imposed the minimum fine of \$1,000 on each count. The indictments charged the storing of breakfast food at the New York ter-

minal for the Kellogg Sales Company, for which the charges should have been \$292; flour at the same terminal for Joseph Moskowitz, for which the storage should have been \$715, and flour for Jacob Kula Sons, \$371. These consignees are to stand trial for having accepted the service at lower than the legal rate.

#### Pacific Limited Time Cut

The schedule of the Pacific Limited, operated by the Chicago & North Western, the Union Pacific and the Southern Pacific, between Chicago & San Francisco, has been cut 6 hr. 10 min. The train now leaves Chicago at 10:30 a. m. instead of 11:20 p.m., and arrives in San Francisco at 10:10 p.m. the third day instead of 5:10 p.m. on the fourth day. Returning, it leaves San Francisco at 12 noon and arrives in Chicago at 7:20 a.m., as formerly.

The schedule of the Columbine, operated by the North Western and the Union Pacific, between Denver, Colo., and Chicago, has been cut 30 min., the train now leaving Denver at 4:30 p.m. instead of 4:00 and arriving in Chicago at 7:45 p.m., as formerly.

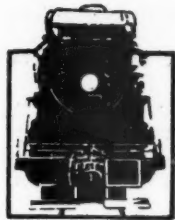
#### I. C. C. Salaries to Be Cut

Salaries of members of the Interstate Commerce Commission, the Board of Mediation, and the United States Shipping Board would be reduced from \$12,000 to \$10,000 a year for the fiscal year ending June 30, 1933, under the provisions of the federal economy bill as agreed upon by the Senate and House conferees this week after reconciliation of the differences in the bills passed by the two houses of Congress. As originally passed one of the bills had provided that these salary reductions should not take effect until next year while another had provided that they should be permanent. In the bill as revised it is provided these reductions shall take the place of the reduction to be applied to federal employees generally by the operation of the one-month payless furlough plan, which is also described by President Hoover as the equivalent of a five-day week.

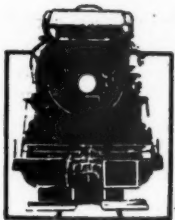
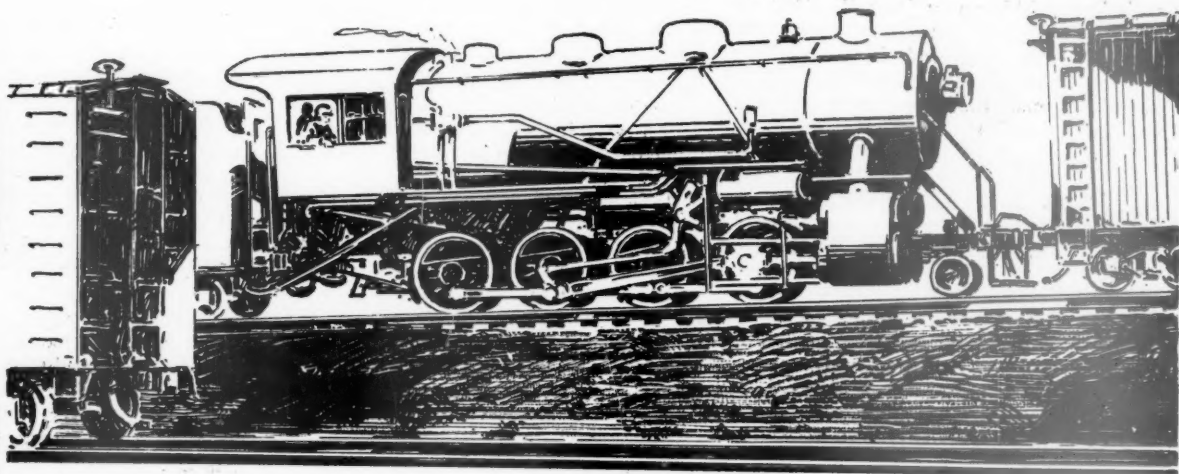
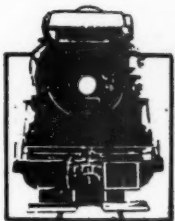
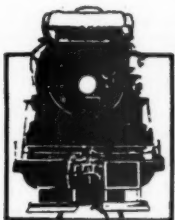
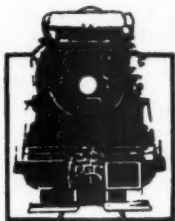
#### Seventh Morning Delivery Asked for Chicago

The directors of the California Growers' & Shippers' Protective League have mailed letters to the freight traffic departments of various western railroads, requesting that the carriers arrange for seventh morning auction delivery for all cars of deciduous fresh fruits from California that arrive in the Chicago outer yards on or before midnight of the sixth day, when so ordered by receivers. It is contended that a considerable volume of this traffic now arrives in the Chicago outer yards on or before midnight of the sixth day after leaving the point of origin under the present schedule, but delivery is not made to the auction until the eighth morning. As a result, shipments are held on the track for 24 hrs. and those arriving on Thursday must be held over until the following Monday. The carriers are asked to establish zones or stations from which seventh morning



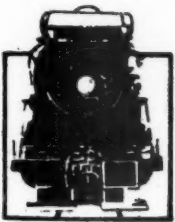


# NO OLD ROAD ENGINE CAN EVER BECOME A MODERN SWITCHER

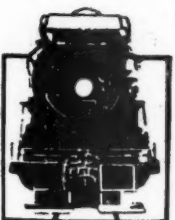


JUST designating an old road engine as a switcher does not make it suitable for switching service. Extensive rebuilding is uneconomical and wasteful since even a rebuilt road engine can't handle the cuts as snappily and as efficiently as modern railroading demands.

Then, too, most old road engines are gluttons for fuel.



Consider that a quarter of all railroad mileage is made by switch engines and the importance of operating only modern locomotives built specifically for switching service becomes apparent.



**LIMA LOCOMOTIVE WORKS, Incorporated LIMA, OHIO**

sale will be guaranteed under existing schedules and without disturbing the present schedules by way of Chicago and East St. Louis to eastern destinations.

### Traffic Officers; R. B. A. Executives Meet in Chicago

Passenger traffic problems now confronting the railways were discussed at a meeting of passenger traffic officers of all railroads at Chicago on June 22. The discussion was informal and no definite action was taken.

A proposal that the annual dinner of the Railway Business Association scheduled at New York in November unite with that of the American Railway Association at White Sulphur Springs, W. Va., in the form of a conference was discussed at a meeting of the executive committee of the Railway Business Association at Chicago on June 21. Definite action was postponed until later. The committee also approved the establishing of the offices of the association in the First National Bank building, Chicago, and the removal of the Philadelphia office to Chicago.

### Jokers Spoil Safety Records

The records of fatal and non-fatal injuries to men in railroad shops, along with cases truly to be classed as accidents, are usually found also to contain, here and there, items in which bodily injury is not accidental, but is caused by the so-called practical joker; and the Safety Section, A.R.A. devotes its July circular (No. 329) to a brief lecture on the contempt due the "Smart Aleck" who is responsible for this disgraceful feature of railroad life. He is termed man's mortal foe. The circular contains a half dozen pictures showing different kinds of tricks, well-known to most shopmen, which are employed by short-sighted workmen who seem to have no useful occupation for their minds.

One of the pictures shows a machinist who was injured by the trick of another who thought it would be fun to put water instead of grease in the barrel of an air-pressure grease gun used for lubricating locomotive rods; and he did just that. When a fellow machinist went to use the gun and turned on the heavy air pressure, heavy grease was first expelled and then water and dirt flew back with great force from the grease plug into the eyes of the machinist using the gun, causing him great pain and permanent impairment of vision.

Employees having knowledge of practical jokes being perpetrated are reminded that if they make no report to superior officers they become accomplices in the crime if a personal injury results.

### Frank J. Sprague Anniversary

July 25, 1932, marks the seventy-fifth anniversary of the birthday of Frank J. Sprague, scientist, inventor, and engineer, whose notable achievements have been largely in the field of transportation—railway and elevator.

Mr. Sprague was born at Milford, Conn., in 1857. He was graduated from

the U. S. Naval Academy in 1878 and remained in the navy until 1883, when he resigned to become an assistant of Thomas A. Edison. This association continued for one year and in 1884 Mr. Sprague organized the Sprague Electric Railway and Motor Company. In 1887 he installed the first trolley system in the United States. This installation, which was at Richmond, Va., consisted of a complete power plant, 13 miles of track and 40 cars, each of which was equipped with two motors. The success of the project was immediate, with the result that it was rapidly followed by numerous installations all over the country.

Notable among Mr. Sprague's contributions to the field of electrical engineering are his inventions associated with elevator operation. The remote control equipment for elevators, which is now universally used, is one of his inventions. Mr. Sprague's most recent improvement in this field is the dual elevator system which he brought out in 1927. His most important invention in the railroad field was the multiple-unit system of control which was installed on the South Side Elevated in Chicago in 1897-98, and which is now used throughout the world.

As a fitting testimonial of the appreciation of Mr. Sprague for his life-long endeavors in the development and improvement of equipment for use in the electrical field, the Frank J. Sprague Anniversary Committee plans to hold a meeting of appreciation and tribute on July 25, at 8 p.m. at the Engineering Societies Auditorium, 29 West 39th Street, New York, N. Y.

### Railways Win Ontario Grain Rate Case

The seasonal rail rates on grain and grain products, set up by the Canadian railways for the purpose of meeting water-borne competition between the head of the lakes and lake ports to points on the St. Lawrence and the Atlantic coast, do not unjustly discriminate against the inland millers of Ontario in favor of the millers of Western Canada, the Board of Railway Commissioners at Ottawa decided in a judgment delivered last week. Such rates, considerably lower than the normal schedule and in vogue only between April and November, may be "hard" on those millers whose geographical position excludes them from their operation, but the board has no authority to compel the railways to extend their application to those millers, the judgment declares.

The issue rose in an application by the Lakeside Milling Co. Ltd., of Toronto, on behalf of all other Ontario grain millers for a rate on eastbound milled products from Ontario points that would be commensurate with the "water-competitive rate" applied on similar traffic from lake ports. Charging that the water-competitive rate operated as a preference extended to western millers, the Ontario representatives claimed that it had disrupted their trade.

The disputed rates are greatly reduced from the normal "out of season" schedule. From the head of the lakes to Montreal, Three Rivers and Quebec they are 21 cents per 100 pounds, and to Saint

John, Sydney, Halifax and Yarmouth, 36 cents per 100 pounds.

The export water-competitive rate from Fort William and Port Arthur to Montreal gives a difference of four cents per 100 pounds in favor of the western millers, and in the 36-cent group, a difference to the advantage of the westerners of seven cents to Saint John and nine cents to Halifax.

Analysis of the traffic from the head of the lakes to St. Lawrence and Maritime points over a period of four years showed that the "lake-and-rail" business had fallen from 96.6 per cent in 1928 to 73.9 per cent in 1931; correspondingly, the "all-water" traffic had increased from 3.4 per cent to 26.1 per cent. It was in order to counteract this decrease in lake-and-rail business that the railways introduced the seasonal competitive rates.

### Development Men Meet at Louisville

Operation of the Inland Waterways Corporation by the government in competition with its own citizens was described as the most iniquitous form of railroad competition by James J. Donohue, general claims attorney for the Louisville & Nashville at the annual meeting of the American Railway Development Association at Louisville, Ky., on June 15-17. Mr. Donohue, whose subject was "Water Transport," presented railroads as an institution which today, through no fault of its management, is flat on its back with its credit impaired and government ownership, not prosperity, just around the corner. On the other hand, he said, it is a story of taxes, well-nigh unbearable, increasing from \$98,626,848 in 1911 to \$343,584,573 in 1930, and finally, of competition of other forms of transport, unfair because they are not adequately regulated or taxed, and because they are receiving enormous subsidies from both federal and state governments. Of the latter, the most iniquitous, certainly from the standpoint of the southeast lines, is competition of the government through operation of the government-owned Inland Waterways Corporation on the Mississippi and Warrior rivers.

William A. Burnett, general manager of the Union Stock Yards Company, Nashville, Tenn., discussed live stock, the real cash crop, expressing the opinion that the time is ripe for farmers to begin to restock their pasture lands with paying livestock, using so far as possible purebred sires, and presenting again that tried and true formula, mixed farming.

The relation between agriculture and industry was discussed by Dr. James S. Thomas, economist for the Commonwealth and Southern Corporation, Birmingham, Ala.

On the afternoon of June 16, the delegates went on a tour of industrial districts of Louisville, including the agricultural markets and manufacturing plants, the trip being made possible through the courtesy of the Kentucky & Indiana Terminal Railroad.

Governmental subsidizing of competing transportation systems, including motor bus, truck and air lines and inland waterways, was attacked by J. M. Fitzgerald of



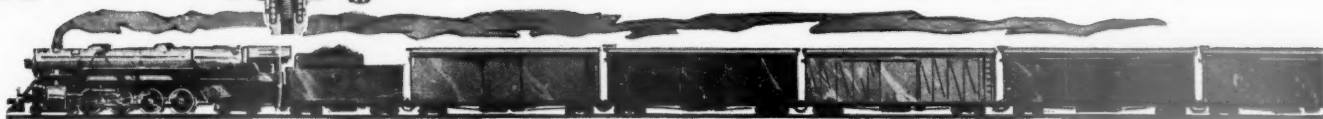
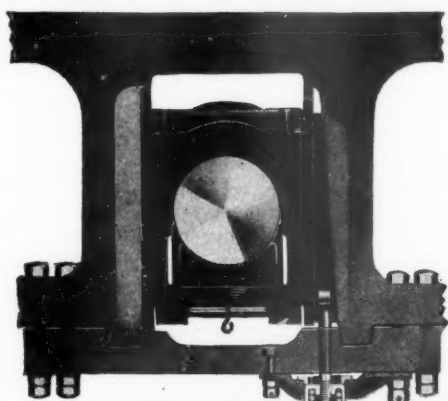
# INCREASE YOUR MILEAGE Per Pound of Rod Bushings

Locomotives with Franklin Automatic Adjustable Wedges make 60% greater mileage per pound of rod bushings than the same locomotives not equipped.

Slack prevention is the reason. By adjusting themselves with each revolution of the drivers, Franklin Automatic Adjustable Wedges keep out the slack that soon develops into brass destroying pounds.

In the control of locomotive maintenance, take advantage of the proved economy of Franklin Automatic Adjustable Wedges.

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## FRANKLIN RAILWAY SUPPLY CO.

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New York, vice-chairman of the Committee on Public Relations of the eastern railroads, in a talk on "The General Railroad Situation." "Millions of dollars of public money is being poured into jerk-water waterways in the vain hope that some day, some way, they will pay," he said. "About 300 rivers in this country have been improved by the government and a lot of them cannot be found on the map."

Officers elected for the ensuing year are: President, C. A. Radford, publicity manager of the Cleveland, Cincinnati, Chicago & St. Louis, Cincinnati, Ohio; first vice-president, J. T. Stinson, director of agricultural development of the Missouri Pacific, St. Louis, Mo.; second vice-president, J. R. Ablett, industrial agent, Delaware & Hudson, Albany, N. Y.; and secretary-treasurer, J. A. Senter, industrial agent of the Nashville, Chattanooga & St. Louis.

### Disregard of Train Order Causing Collision

The engineman of No. 775, an extra interstate freight train of the St. Louis Southwestern, before leaving Pine Bluff, Ark., received a train order, No. 104, to proceed south to the crossover at McNeill and wait for No. 18 going north. At McNeill, however, he received another train order, No. 132, calling for a meet with another train (second 18) further south, at Stamps. He apparently confused train No. 18 with second No. 18, and instead of waiting at the siding at McNeill he moved out on the main track and collided with first No. 18, he and six others being killed.

In an action under the Federal Employers' Liability Act for his death, in which it was admitted that he was negligent, the Supreme Court of the United States holds that his administratrix could not recover on the doctrine of "the last clear chance" because of the negligence of the conductor in failing to give warning or to apply the air brakes. [The doctrine of the last clear chance makes a personal injury the fault of him who has the last clear opportunity to prevent it.] If the conductor was negligent his negligence and that of the engineman were substantially concurrent; and there was no satisfactory proof that if the conductor had taken action such action would have been effective to avert the collision. Judgment of the Arkansas Supreme Court for the plaintiff was reversed.—*St. Louis Southwestern v. Simpson*. (May, 1932.) Opinion by Mr. Justice Cardozo.

This collision occurred on August 2, 1930, and was the subject of a report by the Bureau of Safety of the Interstate Commerce Commission, in September of that year. Following is an abstract of this report:

A southbound extra freight, passing McNeill station where it should have waited for northbound freight No. 18, first section, collided with that train 1½ miles south of the station, wrecking both locomotives and 10 cars. The engineman, fireman and one brakeman of the southbound train, the engineman and fireman of the northbound, and two trespassers, were

killed, and one brakeman was injured. The southbound train had received an order giving it right to McNeill (only) for No. 18, and subsequently another order, directing it to meet Second 18 at Stamps, 17 miles farther south. The engineman was killed, and why he disregarded the order is not known; but the conductor acknowledges that he misread the order as requiring him to meet No. 18, at Stamps. (If, in reading this order, the word "second" is obscured, omitted or ignored, the meaning would be that all sections of No. 18 were to be met at Stamps.) Six pages of the report are taken up with an inquiry as to the circumstances and as to whether or not the conductor of the southbound train had had his mistake called to his attention in time to prevent the collision. Two brakemen said that when the engineman moved out of McNeill, apparently without right, they advised the conductor to apply the airbrakes, but the conductor denies having heard them say anything about the matter. The flagman of this train is also held blameworthy for not discovering that there was something wrong, in the movement of the train from McNeill.

### Reparation for Unlawful Unloading Charge

In an action originally brought in the Federal district court for Northern Illinois by 103 commission merchants engaged in buying and selling livestock at the Union Stock Yards, Chicago, against the Union Stock Yard and Transit Company, owner of the yard, and the Director General of Railroads, under section 206 of the Transportation Act, the Supreme Court of the United States holds that the plaintiffs are entitled to reparations of \$140,001.25 and interest, for an extra charge of 25 cents a car for unloading livestock received at the yards from about 174,000 shippers during the period of Federal control. The action was brought to enforce an order of the Interstate Commerce Commission which held the charge was exacted under an unlawful practice and awarded reparation to the plaintiffs, who, as consignees, had paid the charge. See *Chicago Live Stock Exchange v. Atchison, Topeka & Santa Fe*, 52 I. C. C. 209; 58 I. C. C. 164; 100 I. C. C. 266; 144 I. C. C. 175. The district court held the plaintiffs had no such interest in the claims as would entitle them to maintain the action, 39 F. (2d.) 30. The seventh Circuit Court of Appeals affirmed this, holding, however, that the extra charge was a lawful practice. 51 F. (2d.) 620. These judgments are reversed.

The Supreme Court said that acceptance of the shipments would have rendered the plaintiffs personally liable to the carriers if delivery had been made without payment of the full amount lawfully due; and, as they would have been liable for an undercharge, they might recover for an overcharge. The claim arose when the extra charge was paid. Subsequent reimbursement of the plaintiffs by the shippers did not concern the defendants. As factors for the shippers, the plaintiffs had the right and duty to resist illegal exactions.

The stockyards were held to be terminals of the line-haul carriers, and the evidence was held to sustain the commission's findings that the unloading of livestock at these yards was a part of the transportation provided for in the tariffs of the carriers. The yards company, in the services which it performed, regarded itself as the carriers' agent.

The defendants urged that the yards company was a common carrier, and as such compelled to publish its tariffs, and that the commission had not found the tariff, as published, unreasonable. The court said that the tariff, as published, authorized only the collection as a carrier's agent. The reasonableness of the charge and the complementary question whether the railroads would be required to absorb it, were in no way involved before the commission, which made no finding with respect thereto. The status of the yards company as a common carrier did not prevent it from acting as an agent of the haul-line carriers or collecting a part of its charges from the shippers.—*Adams et al. v. Mills, Director General, et al.* (May, 1932.) Opinion by Mr. Justice Brandeis.

Mr. Justice Butler dissented on the grounds that the plaintiffs were not "persons injured" within the act, and that the "practice" was not unreasonable.

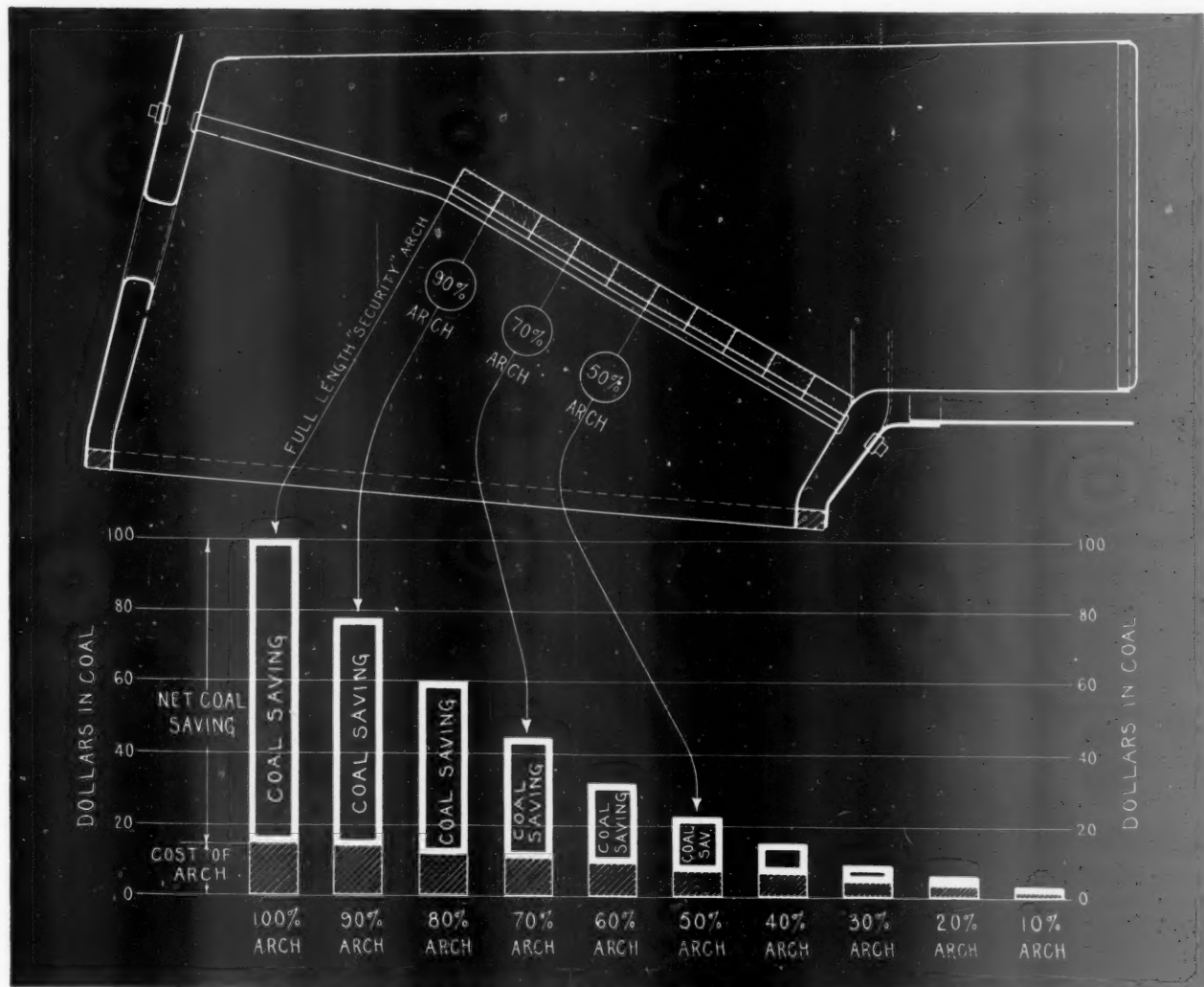
### Public Works Bill Before Senate

The Senate devoted most of its time during the early part of the week of June 20 to the Wagner bill, which proposes to authorize the Reconstruction Finance Corporation to make loans up to a limit of \$1,500,000,000 for the purpose of promoting "self-liquidating" public works. The committee on banking and currency had offered this bill as a substitute for the Rainey-Garner bill which had been passed by the House, which had removed many of the restrictions which now govern loans by the Finance Corporation, but had voted down by a vote of 9 to 6 a proposal to provide for loans to private enterprises. The bill as reported by the committee also included a provision that no loan shall be made under its new provisions by the Finance Corporation to any financial institution, corporation, railroad, or other association or organization of a class to which loans may be made under the Reconstruction Finance Corporation act. The bill also included a provision for a \$500,000,000 bond issue to provide a fund to provide \$120,000,000 for highway construction and \$30,000,000 for rivers and harbors improvements in addition to the \$54,000,000 already provided for in the War Department appropriation bill.

During consideration of the Wagner bill on June 20 the Senate rejected without a record vote an amendment proposed by Senator Fletcher, of Florida, to authorize the Reconstruction Finance Corporation to purchase "equipment trust certificates of American railroads secured by new equipment and the building of which new equipment will provide immediate employment." Senator Fletcher said he had not asked the

(Continued on page 1097)





THE EFFECT OF ABBREVIATED ARCHES ON FUEL SAVING

## Keep Up The Arch To Keep Up Fuel Economy

Twenty years ago the economy of the Locomotive Arch became generally accepted. Then, as locomotives increased in size the Arch became even more indispensable.

Today, in the effort to cut down expenses, remember that a full Arch is the best way to make a dollar's worth of fuel give full value.

Leave off a single course of Arch brick and for every dollar "saving" in Arch cost you lose ten dollars in fuel.

Economy is essential but it should be true economy that results in the greatest net return to the treasury.

This calls for a 100% Arch on every locomotive.

THERE'S MORE TO SECURITY ARCHES THAN JUST BRICK

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REFRACTORIES CO.**  
Refractory Specialists



**AMERICAN ARCH CO.**  
INCORPORATED  
Locomotive Combustion  
Specialists

## Operating Statistics of Large Steam Railways—Selected Items for the Month of April, 1932,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)		Average number of locomotives on line					
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross. Excluding locomotives and tenders	Net. Revenue and non-revenue	Service-able	Un-service-able	Per cent un-service-able	Stored		
New England Region:														
Boston & Albany.....	1932	402	123,496	129,690	8,536	3,334	65.0	175,087	57,437	68	58	45.8	16	
	1931	407	143,211	149,494	12,382	4,024	65.8	210,867	70,400	84	46	35.1	27	
Boston & Maine.....	1932	2,063	277,774	314,555	27,872	8,889	67.3	473,862	169,744	146	144	49.7	21	
	1931	2,066	316,811	364,766	38,149	11,430	68.7	599,166	220,433	228	74	24.5	49	
N. Y., New H. & Hart....	1932	2,056	349,515	415,334	21,081	11,173	62.9	613,026	216,067	216	127	37.1	15	
	1931	2,094	393,099	460,540	23,868	13,852	64.6	751,202	277,689	258	86	25.1	32	
Great Lakes Region:														
Delaware & Hudson.....	1932	848	217,901	288,596	31,180	6,983	58.7	447,967	199,712	249	27	9.8	139	
	1931	876	268,363	356,808	38,998	9,029	61.8	553,204	249,449	248	23	8.5	123	
Del., Lack. & Western....	1932	998	346,538	380,757	47,679	11,216	65.1	658,838	267,013	210	56	21.1	47	
	1931	998	417,494	462,196	51,299	14,129	66.2	799,962	320,412	215	59	21.7	30	
Erie (inc. Chi. & Erie)....	1932	2,316	635,576	660,874	57,314	26,833	61.4	1,635,410	598,940	345	146	29.8	112	
	1931	2,316	716,572	750,628	65,670	31,982	61.0	1,923,213	723,272	385	92	19.4	109	
Grand Trunk Western.....	1932	1,021	191,395	192,934	1,481	4,672	61.7	269,326	89,988	99	50	33.5	36	
	1931	1,019	244,059	246,783	2,433	7,126	62.2	408,806	145,534	115	35	23.5	39	
Lehigh Valley.....	1932	1,343	380,940	401,951	38,609	11,460	62.5	703,988	287,423	202	143	41.4	27	
	1931	1,343	430,355	458,878	45,578	14,201	64.3	856,865	358,121	221	121	35.4	35	
Michigan Central.....	1932	2,115	374,442	374,445	8,783	11,274	60.7	640,832	202,822	128	80	38.4	31	
	1931	1,869	429,116	431,031	10,062	14,449	60.6	817,987	261,919	152	63	29.1	43	
New York Central.....	1932	6,225	1,392,857	1,494,401	86,648	51,227	59.8	3,157,526	1,241,970	638	607	48.8	106	
	1931	6,423	1,663,003	1,802,748	112,671	63,836	60.7	3,848,829	1,501,602	850	476	35.9	269	
New York, Chi. & St. L....	1932	1,660	445,481	457,742	4,883	13,272	60.6	763,389	248,161	156	86	35.5	45	
	1931	1,660	482,264	491,444	4,359	16,180	59.8	945,017	326,598	176	70	28.5	48	
Pere Marquette.....	1932	2,202	296,234	303,976	2,656	6,562	58.8	409,369	148,618	135	41	23.3	31	
	1931	2,201	335,855	346,708	3,369	8,972	61.1	535,909	197,047	159	26	14.1	45	
Pitts. & Lake Erie.....	1932	235	55,028	56,002	673	2,327	58.0	195,979	107,377	50	35	41.1	24	
	1931	235	82,088	83,666	1,031	3,096	59.7	244,420	134,811	60	15	20.6	32	
Wabash.....	1932	2,497	499,915	510,744	10,902	15,207	62.2	858,199	258,171	224	148	39.7	44	
	1931	2,497	681,634	708,360	12,196	20,009	61.5	1,162,920	377,221	277	131	32.2	49	
Central Eastern Region:														
Baltimore & Ohio.....	1932	6,277	1,280,375	1,467,562	144,927	35,811	60.2	2,341,545	993,022	901	448	33.2	274	
	1931	6,285	1,502,540	1,766,500	195,274	47,316	61.4	3,069,154	1,327,303	1,069	292	21.5	317	
Big Four Lines.....	1932	2,790	584,076	601,276	11,739	15,522	60.4	965,574	401,595	231	186	44.6	20	
	1931	2,721	622,076	651,869	18,232	19,313	60.0	1,212,700	518,210	279	152	35.2	62	
Central of New Jersey....	1932	692	166,801	180,139	24,739	4,996	55.3	351,295	161,749	116	62	34.8	41	
	1931	692	196,466	217,895	36,339	6,156	56.7	417,683	186,998	144	43	23.2	43	
Chicago & Eastern Ill....	1932	939	150,100	151,037	2,219	3,040	62.5	180,603	69,688	87	76	46.8	44	
	1931	939	177,019	177,443	2,019	4,489	61.7	278,246	114,059	91	63	41.1	39	
Elgin, Joliet & Eastern....	1932	447	58,508	59,602	2,445	1,314	57.6	95,222	42,899	85	5	5.8	34	
	1931	447	105,752	109,211	4,259	2,692	59.7	207,891	103,252	80	11	12.5	16	
Long Island.....	1932	396	37,287	38,591	14,132	422	52.7	31,312	12,150	41	6	11.9	7	
	1931	400	42,655	45,809	11,805	555	53.1	40,178	15,446	47	7	12.7	—	
Pennsylvania System.....	1932	10,536	2,490,673	2,814,837	272,009	86,226	61.1	5,654,292	2,388,312	2,165	386	15.1	995	
	1931	10,668	3,200,036	3,565,482	353,311	110,864	61.7	7,247,613	3,111,666	2,207	330	13.0	777	
Reading.....	1932	1,453	431,265	466,380	44,781	11,509	57.4	840,856	388,759	305	100	24.8	86	
	1931	1,446	516,246	563,144	53,030	14,133	58.1	999,870	455,358	315	72	18.5	68	
Pocahontas Region:														
Chesapeake & Ohio.....	1932	3,136	700,096	729,613	22,762	26,775	54.4	2,236,191	1,170,450	548	103	15.8	255	
	1931	3,116	900,686	945,235	32,126	32,894	56.2	2,708,645	1,433,439	663	65	8.9	319	
Norfolk & Western.....	1932	2,258	482,326	499,952	22,141	17,138	58.8	1,354,053	675,648	450	32	6.5	217	
	1931	2,232	619,001	673,143	33,632	22,369	59.6	1,750,345	886,094	457	34	6.9	160	
Southern Region:														
Atlantic Coast Line.....	1932	5,144	595,688	598,226	8,319	12,561	61.9	672,181	228,303	379	101	21.0	92	
	1931	5,162	761,018	769,948	11,426	17,899	59.3	1,009,008	349,664	411	79	16.2	80	
Central of Georgia.....	1932	1,900	189,829	191,610	3,006	4,279	66.7	230,483	85,337	95	51	35.2	—	
	1931	1,900	245,347	246,137	4,938	5,605	65.9	312,009	119,744	109	38	25.6	—	
Ill. Cent. (inc. Y. & M. V.)	1932	6,662	1,134,024	1,145,675	18,778	26,609	60.7	1,646,898	612,632	745	194	20.7	66	
	1931	6,670	1,499,155	1,515,005	25,728	36,742	60.1	2,409,690	916,516	754	151	16.7	51	
Louisville & Nashville....	1932	5,263	830,947	876,950	22,048	16,661	58.2	1,118,293	487,885	464	246	34.6	168	
	1931	5,267	1,198,352	1,260,032	32,860	24,820	58.3	1,699,060	763,451	538	160	23.0	125	
Seaboard Air Line.....	1932	4,437	499,235	507,550	4,454	11,134	62.2	642,773	212,299	267	31	10.4	42	
	1931	4,466	572,843	583,716	6,918	13,596	59.6	815,622	284,080	272	26	8.7	27	
Southern.....	1932	6,669	1,032,592	1,043,144	18,738	23,643	65.8	1,274,143	460,236	710	226	24.1	206	
	1931	6,675	1,319,846	1,336,706	26,526	31,152	64.1	1,746,860	671,274	787	185	19.0	198	
Northwestern Region:														
Chi. & North Western....	1932	8,443	852,962	888,435	17,471	20,141	63.1	1,140,787	382,685	643	165	20.4	239	
	1931	8,459	1,097,375	1,160,664	27,780	28,490	62.5	1,668,444	598,300	717	150	17.3	194	
Chi. Gt. Western.....	1932	1,455	186,349	186,519	15,746	6,186	61.0	366,451	126,078	63	51	44.6	5	
	1931	1,459	230,313	230,313	14,591	7,662	59.4	460,385	164,796	110	20	15.1	13	
Chic., Milw., St. P. & Pac.	1932	11,266	1,074,022	1,128,813	54,225	26,809	61.6	1,616,969	616,724	746	165	18.1	374	
	1931	11,302	1,266,415	1,339,335	64,576	35,538	61.9	2,148,636	844,406	771	147	16.0	340	
Chi., St. P., Minn. & Om.	1932	1,714	200,863	207,231	8,326	3,872	67.6	213,940	83,448	144	29	16.9	73	
	1931	1,714	228,651	245,558	10,560	5,005	65.8	281,295	112,293	153	22	12.5	65	
Great Northern.....	1932	8,308	533,561	537,722	15,327	15,095	66.8	880,394	367,289	477	146	23.4	157	
	1931	8,342	578,177	584,905	19,146	19,346	67.5	1,131,938	500,029	484	134	21.7	153	
Minn., St. P. & S. St. M....	1932	4,325	333,739	338,349	3,208	7,043	66.1	381,958	145,865	149	50	25.4	16	
	1931	4,356	352,307	359,987	3,965	8,982	67.4	486,120	195,344	147	70	32.2	40	
Northern Pacific.....	1932													



## Compared with April, 1931, for Roads with Annual Operating Revenues Above \$25,000,000

Region, road and year	Average number of freight cars on line			Per cent un-serv-ice-able	Gross ton-miles per train-hour, ex-cluding locomotives and tenders	Gross ton-miles per train-mile, ex-cluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Loco-motive-miles per loco-motive-day
	Home	Foreign	Total										
New England Region:													
Boston & Albany.....1932	3,955	2,566	6,521	26.2	22,798	1,418	465	17.2	294	26.2	4,766	161	36.6
1931	3,465	3,302	6,767	9.8	21,922	1,472	492	17.5	347	30.1	5,764	154	41.5
Boston & Maine.....1932	11,165	7,235	18,400	12.8	23,881	1,706	611	19.1	308	23.9	2,742	110	39.3
1931	11,155	8,210	19,365	8.9	23,764	1,891	696	19.3	379	28.7	3,557	105	44.5
N. Y., New H. & Hart.....1932	16,074	10,288	26,362	7.6	25,012	1,754	618	19.3	273	22.4	3,504	111	42.3
1931	15,271	12,944	28,215	4.5	25,437	1,911	706	20.0	328	25.3	4,420	108	46.9
Great Lakes Region:													
Delaware & Hudson.....1932	11,664	2,959	14,623	3.9	27,363	2,056	917	28.6	455	27.1	7,848	120	38.6
1931	10,432	4,065	14,497	3.8	26,703	2,061	930	27.6	574	33.6	9,495	122	48.6
Del., Lack. & Western.....1932	19,281	3,828	23,109	7.7	25,851	1,901	771	23.8	385	24.8	8,917	143	53.6
1931	19,100	5,282	24,382	6.4	25,824	1,916	767	22.7	438	29.2	10,700	139	62.5
Erie (inc. Chi. & Erie).....1932	36,309	10,716	47,025	4.2	39,670	2,573	942	22.3	425	31.0	8,620	105	48.8
1931	35,206	12,648	47,854	4.1	39,647	2,684	1,009	22.6	504	36.5	10,411	102	57.0
Grand Trunk Western.....1932	4,430	8,249	12,679	10.5	25,867	1,407	470	19.3	237	19.9	2,937	109	43.6
1931	4,317	8,693	13,010	10.8	26,629	1,675	596	20.4	373	29.4	4,760	98	55.2
Lehigh Valley.....1932	22,450	4,307	26,757	12.4	30,824	1,848	755	25.1	358	22.9	7,134	139	42.6
1931	21,745	6,061	27,806	8.1	30,592	1,991	832	25.2	429	26.5	8,890	133	49.2
Michigan Central.....1932	25,517	16,523	42,040	6.7	32,543	1,711	542	18.0	161	14.7	3,197	121	61.5
1931	25,157	15,540	40,697	6.1	36,491	1,906	610	18.1	215	19.5	4,671	106	68.5
New York Central.....1932	81,548	68,899	150,447	15.0	35,279	2,267	892	24.2	275	19.0	6,650	101	42.3
1931	80,392	61,959	142,351	9.4	34,232	2,314	903	23.5	352	24.6	7,793	99	48.2
New York, Chi. & St. L.....1932	16,178	5,855	22,033	11.2	29,631	1,714	557	18.7	375	33.1	4,983	105	63.7
1931	15,323	7,688	23,011	7.4	31,063	1,960	677	20.2	473	39.2	6,557	99	67.2
Pere Marquette.....1932	13,397	3,568	16,965	3.2	23,557	1,382	502	22.6	292	21.9	2,250	101	58.2
1931	11,588	4,725	16,313	3.9	24,961	1,596	587	22.0	403	30.0	2,984	96	63.1
Pitts. & Lake Erie.....1932	18,608	6,208	24,816	24.3	45,167	3,561	1,951	46.1	144	5.4	15,219	101	22.1
1931	19,571	3,893	23,464	7.0	38,197	2,978	1,642	43.5	192	7.4	19,121	102	37.7
Wabash.....1932	19,328	7,104	26,432	5.6	34,291	1,717	516	17.0	326	30.8	3,447	115	46.7
1931	20,209	8,637	28,846	6.9	33,215	1,706	553	18.9	436	37.6	5,036	111	58.9
Central Eastern Region:													
Baltimore & Ohio.....1932	96,218	15,387	111,605	11.5	24,839	1,829	776	27.7	297	17.8	5,273	153	39.8
1931	93,999	21,053	115,052	7.1	25,894	2,043	883	28.1	385	22.3	7,040	143	48.0
Big Four Lines.....1932	23,068	16,317	39,385	14.6	29,685	1,653	688	25.9	340	21.8	4,797	118	48.9
1931	24,970	20,738	45,708	5.7	31,589	1,949	833	26.8	378	23.5	6,349	112	51.8
Central of New Jersey.....1932	17,520	5,861	23,381	20.5	27,856	2,106	970	32.4	231	12.9	7,789	139	38.4
1931	16,985	8,165	25,150	14.4	26,245	2,126	952	30.4	248	14.4	9,005	144	45.2
Chicago & Eastern Ill.....1932	6,228	1,996	8,224	14.0	21,915	1,203	464	22.9	282	19.7	2,474	147	31.3
1931	5,811	2,497	8,308	7.7	27,077	1,572	644	25.4	458	29.2	4,049	125	38.8
Elgin, Joliet & Eastern.....1932	9,607	3,625	13,232	10.1	13,748	1,628	733	32.6	108	5.7	3,198	132	23.0
1931	9,100	4,724	13,824	5.9	16,855	1,966	976	38.4	249	10.9	7,699	119	41.6
Long Island.....1932	774	3,917	4,691	.8	6,453	840	326	28.8	86	5.7	1,022	319	37.4
1931	755	5,419	6,174	1.0	6,967	942	362	27.8	83	5.6	1,286	312	35.8
Pennsylvania System.....1932	256,281	45,974	296,255	6.6	32,136	2,270	959	27.7	269	15.9	7,556	127	40.3
1931	240,782	55,064	295,846	5.7	31,327	2,265	972	28.1	351	20.2	9,722	122	51.5
Reading.....1932	38,691	7,104	45,795	6.8	23,810	1,950	901	33.8	283	14.6	8,919	142	42.0
1931	36,446	9,373	45,819	3.5	23,161	1,937	882	32.2	331	17.7	10,494	142	53.1
Pocahontas Region:													
Chesapeake & Ohio.....1932	50,625	6,414	57,039	6.0	45,334	3,194	1,672	43.7	684	28.8	12,442	79	38.6
1931	50,380	8,207	58,587	2.8	41,261	3,007	1,591	43.6	816	33.3	15,333	81	44.7
Norfolk & Western.....1932	41,848	3,852	45,700	.8	40,779	2,807	1,401	39.4	493	21.2	9,973	115	36.1
1931	40,257	5,866	46,123	.8	40,464	2,828	1,431	39.6	640	27.1	13,234	119	48.0
Southern Region:													
Atlantic Coast Line.....1932	28,546	6,618	35,164	3.2	20,029	1,128	383	18.2	216	19.2	1,479	117	42.2
1931	27,070	10,008	37,078	4.9	21,756	1,326	459	19.5	314	27.1	2,258	108	53.2
Central of Georgia.....1932	7,878	1,534	9,412	25.1	20,325	1,214	450	19.9	302	22.7	1,497	130	44.4
1931	6,880	2,559	9,439	12.2	20,087	1,272	488	21.4	423	30.0	2,101	135	56.9
Ill. Cent. (inc. Y. & M. V.).....1932	55,592	11,644	67,236	16.6	23,883	1,452	540	23.0	304	21.7	3,065	138	41.3
1931	52,016	15,203	67,219	8.6	25,367	1,607	611	24.9	454	30.3	4,580	138	56.7
Louisville & Nashville.....1932	55,317	6,229	61,546	16.2	20,246	1,346	587	29.3	264	15.5	3,090	157	42.2
1931	52,538	9,304	61,842	11.4	20,672	1,418	637	30.8	412	22.9	4,831	145	61.7
Seaboard Air Line.....1932	15,175	5,386	20,561	5.5	20,885	1,288	425	19.1	344	29.0	1,595	127	57.3
1931	16,509	7,828	24,337	5.1	20,290	1,424	496	20.9	389	31.2	2,120	129	66.0
Southern.....1932	57,206	8,972	66,178	13.7	20,341	1,234	446	19.5	232	18.1	2,300	151	37.8
1931	54,703	12,850	67,553	13.1	20,006	1,324	509	21.5	331	24.0	3,352	152	46.7
Northwestern Region:													
Chi. & North Western.....1932	45,803	16,803	62,606	6.3	19,644	1,337	449	19.0	204	17.0	1,511	136	37.4
1931	53,755	20,484	74,239	9.3	21,531	1,520	545	21.0	269	20.5	2,358	130	45.7
Chi. Gt. Western.....1932	5,121	3,227	8,348	11.4	33,112	1,966	677	20.4	503	40.5	2,888	131	59.4
1931	4,602	3,541	8,143	7.6	33,219	1,999	716	21.5	675	52.8	3,765	119	62.7
Chi., Milw., St. P. & Pac.....1932	63,997	11,254	75,251	3.2	22,737	1,506	574	23.0	273	19.3	1,825	127	43.3
1931	60,172	13,332	73,504	2.9	24,278	1,697	667	23.8	383	26.0	2,490	119	51.0
Chi., St. P., Minn. & Om.....1932	2,180	7,350	9,530	8.2	15,874	1,065	415	21.6	292	20.0	1,623	122	41.5
1931	3,035	7,630	10,665	7.8	17,586	1,230	491	22.4	351	23.8	2,184	117	48.9
Great Northern.....1932	45,200	7,256	52,456	6.6	24,374	1,650	688	24.3	233	14.4	1,474	132	29.6
1931	43,602	7,054	50,656	5.7	26,222	1,958	865	25.8	329	18.8	1,998	129	32.6
Minn., St. P. & S. St. M.....1932	20,829	2,822	23,651	4.1	17,616	1,144	437	20.7	206	15.0	1,124	112	57.2
1931	20,336	3,317	23,653	4.0	19,294	1,380	554	21.7	276	18.8	1,495	101	55.9
Northern Pacific.....1932	42,799	3,476	46,275	9.3	23,829	1,625	671	22.3	213	12.9	1,539	145	31.8
1931	41,985	4,536	46,521	10.0	25,486	1,765	731						



# THE LOCOMOTIVE

**F**IRST, let us examine its present condition. At the end of 1930, out of a total inventory of approximately 56,000 units, almost exactly 50 per cent was 20 years old or more. Approximately 80 per cent was over 10 years old. In 1931 orders were placed for 237 new units, and in 1932 to date orders have been practically nil. And all this in face of the knowledge that no locomotive built prior to 1925 can be considered modern.

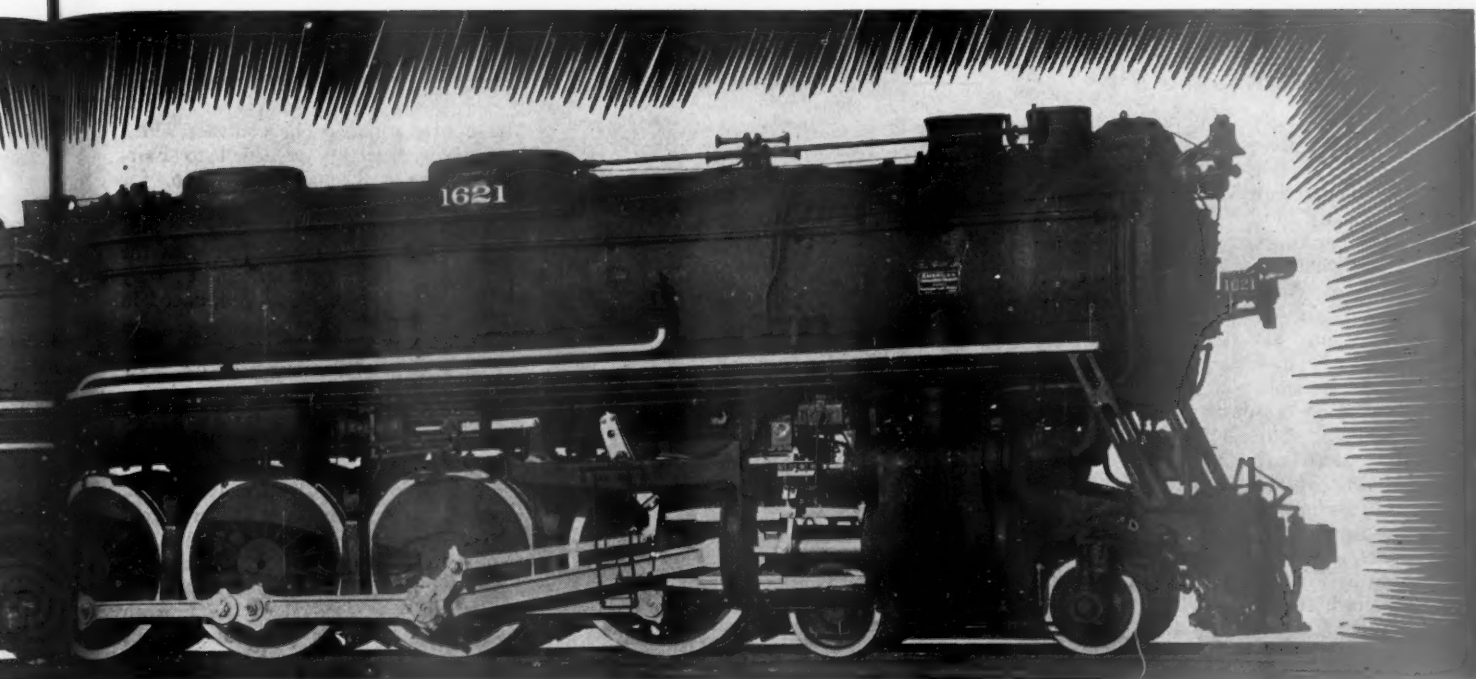
Of course, these older engines can still haul trains, but, because of their low capacity and slow operating speeds they are turning too big a percentage of gross revenue into operating expenses.

Now these are the facts. Yet here we have a major industry like our railroads, facing competition such as they never faced before, with their motive power, which is the source of all their operating activity, in such a state of obsolescence.

Such a condition cannot be allowed to indefinitely remain in any industry if that industry expects to continue to exist.

**AMERICAN LOCOMOTIVE CO.**  
**30 CHURCH STREET**





# E INVENTORY.....

And this is not the whole story. For we positively know, and it is freely admitted, that modern locomotives, under anything like normal conditions, show sufficient economies to carry not only all the necessary capital requirements but also a profit over and above this service. And they also mean a larger and better service to the public along with this more satisfactory account to the railway security owner.

A 10 year program of from 1500 to 2000 new locomotives a year would not do much more than take care of half the necessary replacements. But it would be a direct attack on the problem of unemployment. It would also be a case of the use of credit for an improvement that is imperative; that someday, sometime, must be done; and where the credit so employed would positively earn its keep.

Where, if anywhere, is there a more practicable or more helpful avenue of activity for consideration by both our railroads, and the Reconstruction Finance Corporation?

LOCOMOTIVE COMPANY  
NEW YORK CITY

## NEWS

(Continued from page 1094)

railroads about it but that he was seeking to carry out a recommendation made by George H. Houston, president of the Baldwin Locomotive Works, in his testimony recently before the Senate committee on banking and currency, and that Mr. Houston had estimated that \$150,000,000 expended for railroad equipment would employ directly in excess of 100,000 men. Mr. Houston had testified as to the advantages that would result from replacing obsolete locomotives and other equipment with more modern types, but Senator Couzens closed the debate by referring to the large number of idle cars and locomotives and saying the railroads do not need any more equipment. Other Senators expressed the opinion that the Reconstruction Finance Corporation was doing enough for railroads under its present authorization. Senator Walcott asked if the amendment might be construed as giving the corporation authority to loan money to railroads to enable them to take up outstanding bonds that could be purchased at "bargain" prices, but was told that that was not the purpose.

## Equipment and Supplies

### IRON & STEEL

THE VIRGINIAN & WESTERN has given a contract to the American Bridge Company for furnishing steel for bridges at M.P. 35.5 and M.P. 37.9, on the Guyandot River line. These bridges are situated in Wyoming and Mingo counties, W. Va., and the estimated weight is 480 tons.

THE LATEST EXAMPLE of the manner in which the Great Western of Great Britain has adapted its co-ordinated operations to the transport needs of every potential patron is the "easy way moving day service" for the transfer of household goods. In connection with this service, which was mentioned briefly in the article entitled "British Railways Show Fight" appearing in the *Railway Age* of June 4, the Great Western holds itself out to handle the entire moving job, including the packing of goods in special containers, the re-laying of carpets and linoleum and the hanging of pictures.

The road makes a specialty of 24-hour house-to-house moving service, a typical example being the removal in that time of a consignment of household goods from Cornwall to South London, involving a rail haul of 300 miles. The latest feature of the plan is the introduction of special fares at 33 1/3 per cent under the standard passenger rates for families and their servants involved in the moving.

## Supply Trade

**R. A. Davidson**, formerly associated with the Lincoln Electric Company, has been appointed general manager of sales of the **Hollup Corporation**, Chicago.

**Eugene J. Buffington**, for the past 34 years president of the **Illinois Steel Company**, will be retired at his own request, on July 1 under the pension plan of the United States Steel Corporation. He will, however, continue as a director. The Finance Committee of the United States Steel Corporation has recommended that **George G. Thorp**, vice-president of the Illinois Steel Company, be elected president to succeed Mr. Buffington and that **George Cook Kimball**, vice-president of the American Sheet & Tin Plate Company, be elected vice-president of the Illinois Steel Company to succeed Mr. Thorp, with headquarters at Chicago.

### OBITUARY

**Mark A. Ross**, at one time general manager of the headlight department of the Buda-Ross Company, Harvey, Ill., died in Flossmoor, Ill., on May 23.

**W. H. Baldwin**, who retired as vice-president of the Adams & Westlake Company in February, 1929, died at Highland Park, Ill., on June 19 of heart failure. He entered the employ of the Adams & Westlake Company in 1908 as assistant general manager, which position he held until 1915, when he was promoted to general manager. In 1927 he was elected vice-president, which position he held until his retirement.

**Charles J. McPherson**, sales manager, automotive car division, of The J. G. Brill Company, Philadelphia, Pa., died suddenly from a heart attack in Chicago on June 18. Mr. McPherson was born on July 5, 1886, at Hopkinsville, Ky. He completed his education in the University of Kentucky, from which he was graduated in 1906, later receiving his M. E. degree from the same institution. He was first associated with the Baldwin Locomotive Works and then the American Car & Foundry Company before joining the Brill engineering staff on March 4, 1913. In the early days of the World War Mr. McPherson spent considerable time in Russia representing the Brill Company's interests. After serving for a number of years as assistant superintendent, he entered the sales department in September, 1920, and was in charge of sales of the automotive car division, handling rail motor cars for steam railroads, from October, 1923, until his death. Mr. McPherson was a member of a number of clubs and associations including the American Railway Car Institute, the American Society of Mechanical Engineers, the Society of Automotive Engineers, and the Railroad Club of New York.

## Construction

**MISSOURI PACIFIC.**—The contract which this company recently awarded to Fairbanks, Morse & Company, Chicago, for the construction of a 50-ton steel locomotive coaling station at Ordway, Colo., included all work in connection with the construction of the plant instead of only the erection of the steel, as announced in the *Railway Age* for June 11.

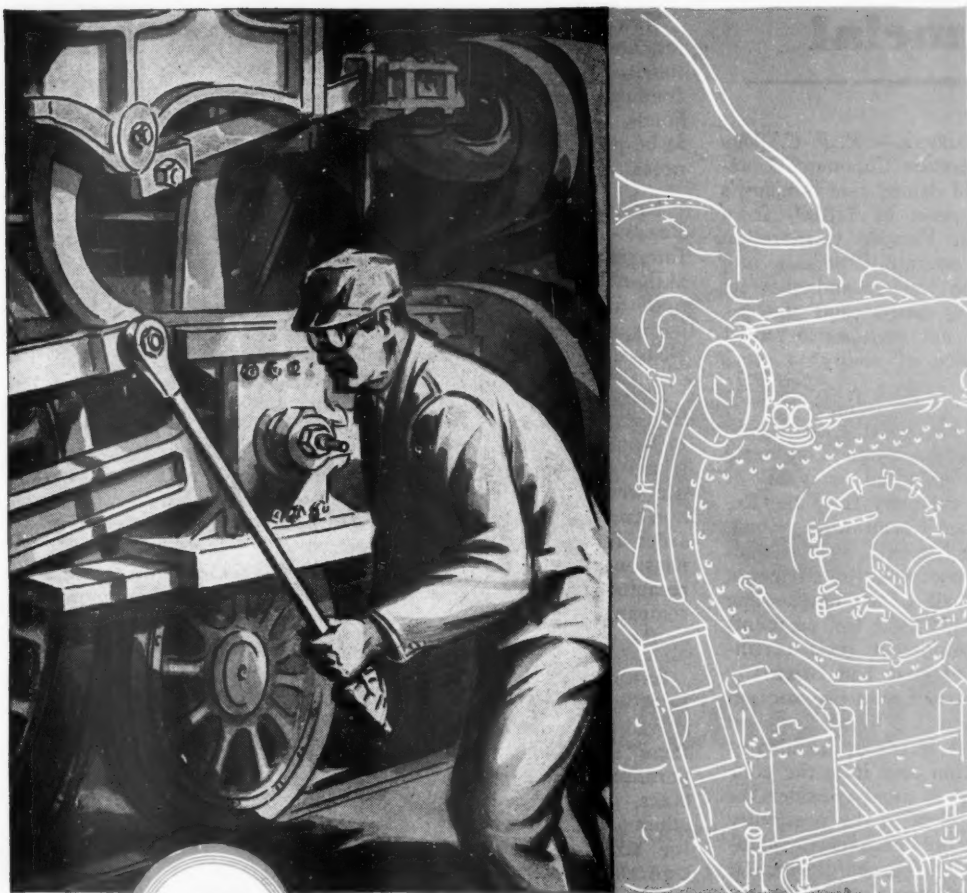
**PUBLIC SERVICE COMMISSION OF NEW YORK.**—The Public Service Commission of New York has approved detailed plans, specifications and a revised estimate of cost for the elimination of the Wilson Road, Main Street, Oakwood Avenue, Persons Street and Olean Street grade crossings of the Pennsylvania, in and near East Aurora, N. Y. The commission has also approved plans and cost estimates for the removal of the Suffern and Rockwell crossings of the Erie, these crossings being located in Elmira Heights, N. Y., and Horseheads. Proceedings for the elimination of the East Pulteney, Baker and Arthur Street crossings of the New York Central in Corning, N. Y., have been closed by the commission. The Steuben Street crossing of the Delaware, Lackawanna & Western in Painted Post, N. Y., has been designated for elimination, which will be accomplished by closing the crossing and diverting highway traffic to an existing overcrossing located nearby. The same procedure is to be followed, according to a commission order, in the removal of grade crossings of the Delaware & Hudson at Freiot avenue, Guilford road (Beatty crossing) and Johnson, Scott, Walnut and Tyler streets, Bainbridge, N. Y., these crossings being closed and traffic from them being diverted to a new highway underpass to be constructed at a point about 1,000 ft. northeast of the present Freiot Avenue crossing.

**PUBLIC UTILITY COMMISSIONERS OF NEW JERSEY.**—The New Jersey Board of Public Utility Commissioners has authorized the city of Burlington, N. J., to close an existing grade crossing of the Pennsylvania at Sluice road, and to substitute therefor a new crossing to be constructed at Park avenue, about 1,700 ft. east of Sluice road. The state board has also authorized the closing, by the Pennsylvania & Atlantic, of a grade crossing at Upton station, Pemberton, N. J.

**MODERN CAR LIGHTING.**—This is the title of a 32-page illustrated booklet issued by the Electric Storage Battery Company, Philadelphia, Pa. The first part of the booklet gives an outline of the methods employed in modern car lighting practice and the second part treats of the storage battery and how it works. The chemical behavior of the storage battery is diagrammatically shown. One chapter deals with the importance of regulator settings. Other sections present useful information concerning the measurement of illumination, wiring tables and sample wiring calculations.

Continued on next left-hand page





## **A STRETCHING BOLT MAY START TROUBLE**

Stretching bolts open the way to endless mechanical troubles. « And stretching bolts were a common occurrence before Republic developed Agathon alloy engine bolt materials. « These materials possess the fatigue resistance that in the past made iron the favored material, but they have the necessary high tensile strength to hold without stretching. « Agathon Engine Bolt Steels are uniform and free from the slag pockets, seams and inclusions that may ruin a partially machined bolt. « They are the modern engine bolt materials developed for modern railroading. « In the old days with little locomotives the old materials could manage the low stresses. « But today's locomotives need modern materials.

Toncan Iron Boiler Tubes, Pipe, Plates, Culverts, Rivets, Staybolts, Tender Plates and Firebox Sheets • Sheets and Strip for special railroad purposes • Agathon Alloy Steels for Locomotive Parts • Agathon Engine Bolt Steel • Nitralloy Agathon Iron for pins and bushings • Agathon



Staybolt Iron • Climax Steel Staybolts • Upson Bolts and Nuts • Track Material, Maney Guard Rail Assemblies • Enduro Stainless Steel for dining car equipment, for refrigeration cars and for firebox sheets • Agathon Nickel Forging Steel (20-27 Carbon) . . . . .

C E N T R A L   A L L O Y   D I V I S I O N

# **REPUBLIC STEEL CORPORATION**

M A S S I L L O N ,   O H I O

## Financial

**ARLINGTON & FAIRFAX.—R. F. C. Loan Denied.**—The Interstate Commerce Commission on June 18 denied this company's application for a loan of \$18,000 from the Reconstruction Finance Corporation to pay interest, operating deficits and other expenses, on the ground that its prospective earning power and the security offered are not such as to afford reasonable assurance of ability to repay the loan.

**CHICAGO, ROCK ISLAND & PACIFIC.—R. F. C. Loan.**—The Interstate Commerce Commission has approved a loan of \$10,000,000 to this company from the Reconstruction Finance Corporation to mature not later than March 1, 1934, including \$4,621,519 to meet interest payments, \$4,375,000 to pay half of its outstanding bank loans, and \$1,003,480 for payments on principal of equipment trust certificates. The Rock Island had originally applied to the Railroad Credit Corporation for the amount required to pay interest but the report says it is not inclined to press that application and it is the commission's view that it must consider the application with a view to the possibility that the Reconstruction Finance Corporation will be the only source to which it may look for assistance during the remainder of the year. The commission had found the value of the property in the Rock Island system to be \$342,459,107 as of 1915 and the report says that with adjustments for net additions to December 31, 1931, this would become \$504,090,000. As collateral for the loan the commission requires the company to pledge bonds of a par value of \$26,336,473, including half of the collateral now pledged with the banks.

**FORT SMITH & WESTERN.—R. F. C. Loan.**—The Interstate Commerce Commission has approved an additional loan of \$65,434 to the receiver from the Reconstruction Finance Corporation to meet various bills and taxes. The commission had previously approved a loan of \$162,000 on the original application for \$250,000, after which a supplemental application was filed.

**FRANKFORT & CINCINNATI.—R. F. C. Loan.**—This company has amended its application for a loan from the Reconstruction Finance Corporation by reducing the amount asked from \$50,000 to \$22,285.

**HOOSAC TUNNEL & WILMINGTON.—R. F. C. Loan.**—This company has applied to the Interstate Commerce Commission and the Reconstruction Finance Corporation for a loan of \$60,000.

**MOUND CITY & EASTERN.—R. F. C. Loan.**—This company has applied to the Interstate Commerce Commission and the Reconstruction Finance Corporation for a loan of \$850,000 to pay indebtedness, complete construction work, and purchase equipment.

**NEW YORK CENTRAL.—Bonds.**—The Interstate Commerce Commission has authorized an issue of \$75,000,000 of refunding and improvement mortgage bonds, Series C, all or any part thereof to be pledged as collateral for short-term notes.

**NEW YORK, NEW HAVEN & HARTFORD.—Bonds.**—This company has applied to the Interstate Commerce Commission for authority for an issue of \$25,516,000 of first and refunding mortgage 40-year bonds, to reimburse the treasury and to be pledged from time to time as collateral.

**PRESCOT & NORTH-WESTERN.—Suit To Enjoin Recapture Order.**—This company on June 16 filed in the United States district court for the Texarkana division of the western district of Arkansas a petition for the purpose of enjoining the final order for the Interstate Commerce Commission of February 1 which sought to recapture \$7,047, representing half the company's excess income as determined by the commission for the year 1925.

**SAND SPRINGS.—R. F. C. Loan.**—The Interstate Commerce Commission has approved a loan of \$162,600 to this company from the Reconstruction Finance Corporation to enable it to pay interest and taxes, but has deferred consideration of other parts of the application, which was for \$269,498, including a \$10,000 bank loan and a note for \$75,000 to the Sand Springs Home which controls the railway and which is also indebted to it in the amount of \$79,046.

**SAVANNAH & ATLANTA.—R. F. C. Loan.**—The receiver has applied for a loan of \$828,761 from the Reconstruction Finance Corporation to pay taxes, receiver's certificates and various claims.

### Dividends Declared

Allegheny & Western.—\$3 semi-annually, payable July 1 to holders of record June 20.  
Canada Southern.—\$1.50, semi-annually, payable August 1 to holders of record July 1.  
Carolina, Clinchfield & Ohio.—Certificates, \$1.25, quarterly; Common, \$1, quarterly, both payable July 11 to holders of record June 30.  
Cincinnati Union Terminal.—Preferred, \$1.25, quarterly, payable July 1 to holders of record June 20.  
Kansas City Southern.—Preferred, 50c, quarterly, payable July 15 to holders of record June 30.  
Mahoning Coal R.R.—Common, \$6.25, payable August 1 to holders of record July 15; Preferred, \$1.25, semi-annually, payable July 1 to holders of record June 24.  
Northern Pacific.—Dividend omitted.  
Pittsburgh & Lake Erie.—\$1.25, payable August 1 to holders of record July 1.  
Texas & Pacific.—\$5.00 preferred dividend omitted.

### Average Prices of Stocks and of Bonds

	June 21	Last week	Last year
Average price of 20 representative railway stocks..	13.99	14.26	70.13
Average price of 20 representative railway bonds..	51.61	50.46	91.23

THE RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY (Boston, Mass.) has issued its bulletin No. 28, dated May, 1932. Its 63 pages are made up largely of matter concerning the centenary of railroads in Canada, including also the golden jubilee of the Canadian Pacific, and an article on the Canadian Northern. Halftone engravings of a number of interesting old locomotives, 1850 and later, are included.

## Railway Officers

### EXECUTIVE

**C. P. Couch**, executive vice-president of the Louisiana & Arkansas and president of the Louisiana, Arkansas & Texas, a subsidiary, has been elected president of the former road, to succeed **H. C. Couch**, who is serving as a director of the Reconstruction Finance Corporation.

**John Leslie**, vice-president and treasurer of the Canadian Pacific, will retire on July 1, and **E. E. Lloyd**, comptroller, has been appointed Mr. Leslie's successor. Mr. Leslie was born in Toronto, Ont., and was educated in the model and normal schools and in the Collegiate Institute. He began railway service as a junior clerk on the Toronto, Grey & Bruce, and subsequently served as cashier, general accountant and general



John Leslie

auditor. In 1884, when the T. G. & B. was taken over by the Canadian Pacific, Mr. Leslie became chief clerk in the accounting department, and was later appointed auditor of disbursements. He was appointed assistant comptroller in 1908, and comptroller in 1914, and from 1918 on was in entire charge of the company's accounting department in all its branches. In January, 1926, Mr. Leslie was elected vice-president and comptroller, and in 1928, he was appointed vice-president in charge of finance and treasurer, the positions he will relinquish upon his retirement.

Mr. Lloyd, who succeeds Mr. Leslie as vice-president and treasurer, was born in Grimsby, England, on September 2, 1868. He came to Canada and settled in Manitoba in July, 1876, and after attending the public schools and studying law for one and one-half years, he entered the service of the Canadian Pacific on December 26, 1887, in the stores department at Winnipeg, Man. On December 17, 1897, he became chief clerk in the stores department at Vancouver,

Continued on next left-hand page





## From Every Locomotive

EVERY dollar saved in locomotive operation represents a dollar on the net income statement of the financial report—no more carving for maintenance, fuel, taxes, etc.

No locomotive can be exempted—every one in service must be made to produce the maximum amount of work for the lowest possible maintenance cost.

The use of super-service wear resisting parts still offers big opportunities of increasing the net earnings of your locomotives.

Standardization on the complete list of HUNT-SPILLER *Air Furnace* GUN IRON parts will help you to make a big reduction in the items of fuel and maintenance.

*The more completely equipped  
the larger your savings.*

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Cylinder Bushings  
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Pistons or Piston Bull Rings  
Valve Bushings  
Valve Packing Rings  
Valve Bull Rings  
Crosshead Shoes  
Hub Liners  
Shoes and Wedges  
Floating Rod Bushings

**Parts Finished for  
Application**

Dunbar Sectional Type  
Packing  
Duplex Sectional Type  
Packing  
(Duplex Springs for Above  
Sectional Packing)  
Cylinder Snap Rings  
Valve Rings All Shapes

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B. C., and the following February was transferred in the same capacity to Montreal, Que. When the stores ac-



E. E. Lloyd

counting was separated from the stores department on January 1, 1905, Mr. Lloyd went with the auditor of stores as chief clerk. On January 15, 1910, he became assistant auditor of stores and mechanical accounts, and on August 1, 1913, was appointed auditor of the department. Mr. Lloyd was appointed auditor of disbursements on March 18, 1918, and assistant comptroller on February 1, 1921, which position he held until February, 1928, when he became comptroller.

## FINANCIAL, LEGAL AND ACCOUNTING

**G. C. Ramsey** has been appointed freight claim agent of the St. Louis Southwestern in charge of overcharge claim matters, while **A. J. Trussell** has been appointed freight claim agent in charge of reconsignments. Mr. Ramsey and Mr. Trussell, whose headquarters are at St. Louis, Mo., will take over the duties formerly discharged by **J. W. Wise**, general freight claim agent, deceased.

**L. B. Unwin**, assistant comptroller of the Canadian Pacific, has been appointed comptroller, succeeding **E. E. Lloyd**, who has been elected vice-president and treasurer. **E. A. Leslie**, assistant comptroller, has been appointed deputy comptroller.

Mr. Unwin entered the service of the C. P. R. as a clerk in the office of the assistant superintendent at Chappleau, Ont., in 1908. He continued to serve in the Ontario district at Chappleau, White River and Schreiber until the outbreak of the World War, when he enlisted for service. In June, 1919, he re-entered the service of the Canadian Pacific as an accountant at Sudbury, Ont., and subsequently served as statistician in the office of the general manager at Montreal, chief of the joint facilities bureau, and chief clerk to the comptroller. On July 2, 1926, he was appointed assistant auditor of miscellaneous accounts, and on

February 10, 1928, he became assistant comptroller.

Mr. Leslie, who has been appointed deputy comptroller, was born at Montreal, Que., on July 11, 1895, and received his higher education at McGill Uni-



L. B. Unwin

versity, from which he was graduated in 1916, with a B. Sc. degree. In July, 1919, after serving in the World War, he entered railroad service with the Canadian Pacific as clerk in the general manager's office at Montreal. In December of that year he became secretary to the general manager, and the following year he was appointed chief clerk, Toronto Terminal division. In 1921, he became statistician in the general man-



E. A. Leslie

ager's office. From 1925 to 1928, he served as chief joint facility accountant. In 1928, he was appointed assistant comptroller, the position he held until his recent promotion.

## OPERATING

**J. G. Metcalfe**, superintendent of the Cincinnati division of the Louisville & Nashville, with headquarters at Latonia, Ky., has had his jurisdiction extended to include the Cincinnati terminals, while **W. O. Dilley**, superintendent of

the Louisville division, at Louisville, Ky., has had his jurisdiction extended over the Louisville terminals. **R. D. Ross**, superintendent of the Cincinnati terminals, with headquarters at Latonia, has been appointed superintendent of the Nashville division, with headquarters at Nashville, Tenn., to succeed **J. R. Wheeler**, who has retired. **F. M. Wooddall**, superintendent of the Louisville terminals, has been appointed assistant superintendent of the Louisville division with headquarters as before at Louisville.

**R. W. Simpson**, assistant general manager of the Atlantic region of the Canadian National, retired effective June 1. Mr. Simpson was born in Scotland, and came to Canada at an early age. After graduating from the Royal Military College at Kingston, Ont., in civil engineering he entered railroad service with the Intercolonial (now a part of the Canadian National), on July 22, 1889, in the chief engineer's office, where he remained until August, 1902, when he was appointed assistant chief engineer. In June, 1909, he became advisory engineer to the board of management. In November, 1912, he was appointed advisory engineer to the board of management and general superintendent and in September of the next year he was appointed assistant to the general manager; he also held the position of general fuel and tie agent. In December, 1918, Mr. Simpson was appointed assistant to the general superintendent and in June, 1922, he was promoted to acting general superintendent. Upon the co-ordination of all government-owned lines into the Canadian National in March, 1923, Mr. Simpson was ap-



R. W. Simpson

pointed assistant to the general manager of the Atlantic region, and in April, 1924, he was advanced to assistant general manager of that region, which position he held until his retirement.

## TRAFFIC

**Robert Thomson**, assistant passenger traffic manager of the Chicago & North



# THE LEADING BUS AND TRUCK TIRES

**P**UT these two facts above anything else anybody else may tell you when you are buying truck tires:

*More motor coach passengers are carried on Goodyear Tires than on any other kind.*

*More tons are carried on Goodyear Truck Tires than on any other kind.*

Public preference. Operators' preference. Owners' preference.

There must be good reasons for it. There are:

*World-famous All-Weather Tread—deep, thick, sharp-edged diamond blocks that make powerful, sure, safe headway, give powerful, sure, safe braking—in the center of the tread—where traction belongs!*

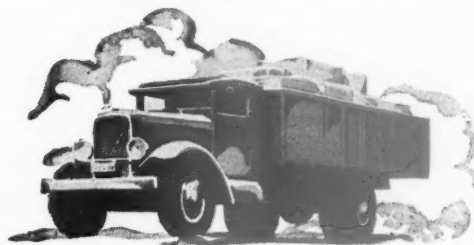


*Staunch carcass sinewed with Goodyear Super-twist Cord, extra-elastic, extra-resilient, cool and buoyant over any distance, sustaining scheduled speed.*

Less tire trouble, more protective cushioning, lower tire mile costs — *why shouldn't you have them when Goodyear Balloons cost no more?* Put the question up to your Goodyear Truck Tire Service Station Dealer today.

*Extra valuable, too, are the advantages of K-Rims — noted for their ease of operation, with open valve stem slot and split base; for their safety in service, and for their interchangeable mounting.*

**TUNE IN:** Goodyear invites you to hear the Revelers Quartet, Goodyear Concert-Dance Orchestra and a feature guest artist every Wednesday night, over N. B. C. Red Network, WEAf and Associated Stations



*On Your New Trucks*

*Specify Goodyears*

# GOODYEAR

**MORE TONS ARE HAULED ON GOODYEAR TIRES THAN ON ANY OTHER KIND**

Western, has been promoted to passenger traffic manager, with headquarters as before at Chicago, to succeed **Charles A. Cairns**, who will retire on July 1, under the retirement rules of this company. The position of assistant passenger traffic manager has been discontinued.

Mr. Thomson has been associated with the traffic department of the North Western for more than 32 years. He was born on May 15, 1876, at Edinburgh, Scotland, and was educated in the public schools of that country. His first railway experience was with the passenger traffic department of the Chicago & Grand Trunk (now part of the Grand Trunk Western), with which he became connected in 1890. After nine years with this company, he entered the service of the North Western as a rate clerk at Chicago, later being advanced to chief rate clerk at that point. In 1914, Mr. Thomson was promoted to assistant general passenger agent, with headquarters at Chicago, and on March 1, 1928, he was further advanced to assistant passenger traffic manager, which po-



Robert Thomson

sition he held until his recent appointment as passenger traffic manager.

Mr. Cairns is bringing to a close 54 years of active railroad service, nearly all of which has been spent in the traffic departments of a number of roads. He was born at Cleveland, Ohio, and after a public school education he entered railway service in 1878 as a messenger in the general offices of the Cleveland, Columbus, Cincinnati & Indianapolis (now the Cleveland, Cincinnati, Chicago & St. Louis). After serving for a time as a stock clerk, Mr. Cairns was appointed chief clerk in the combined passenger departments of the C. C. C. & I., the Indianapolis & St. Louis (now also part of the Big Four), and the Dayton & Union. On April 15, 1889, Mr. Cairns resigned the latter position to become chief clerk in the passenger department of the Chicago, St. Paul & Kansas City (now the Chicago Great Western). In 1890, he was advanced to assistant general passenger and ticket agent. Two years later, Mr. Cairns entered the service of the Chicago & North Western in the general passenger department,

where he was appointed assistant general passenger and ticket agent in 1895. From March 1, 1903, to November 15, 1917, he was general passenger and ticket agent, being on the latter date



Charles A. Cairns

promoted to passenger traffic manager, which position he held continuously until his retirement on July 1.

**George E. Carter**, assistant general passenger agent of the Canadian Pacific, with headquarters at Montreal, Que., has been appointed general passenger agent, Eastern Lines, succeeding **George A. Walton**, deceased. Mr. Carter entered the service of the C. P. R. as a stenographer in the passenger department at St. John, N. B., in 1914, but shortly thereafter left to enlist for service in the World War. Returning from overseas at the close of the war, he re-entered the passenger department of the Canadian Pacific at St. John. He subsequently held various positions in the same department at Quebec, and later served as chief clerk in the New York and Montreal offices of the passenger department. In 1928, he was appointed



George E. Carter

district passenger agent at St. John, and in 1930 he was advanced to assistant general passenger agent in Montreal, which position he held until his recent promotion.

## ENGINEERING AND SIGNALING

**L. C. Frohman**, principal assistant engineer of the Florida East Coast, with headquarters at St. Augustine, Fla., has been appointed chief engineer.

**F. M. Hawthorne**, engineer maintenance of way on the Pennsylvania, with headquarters at Cleveland, Ohio, has been appointed division engineer of the Cleveland division, with the same headquarters, to succeed **J. M. Fox**, who has been transferred.

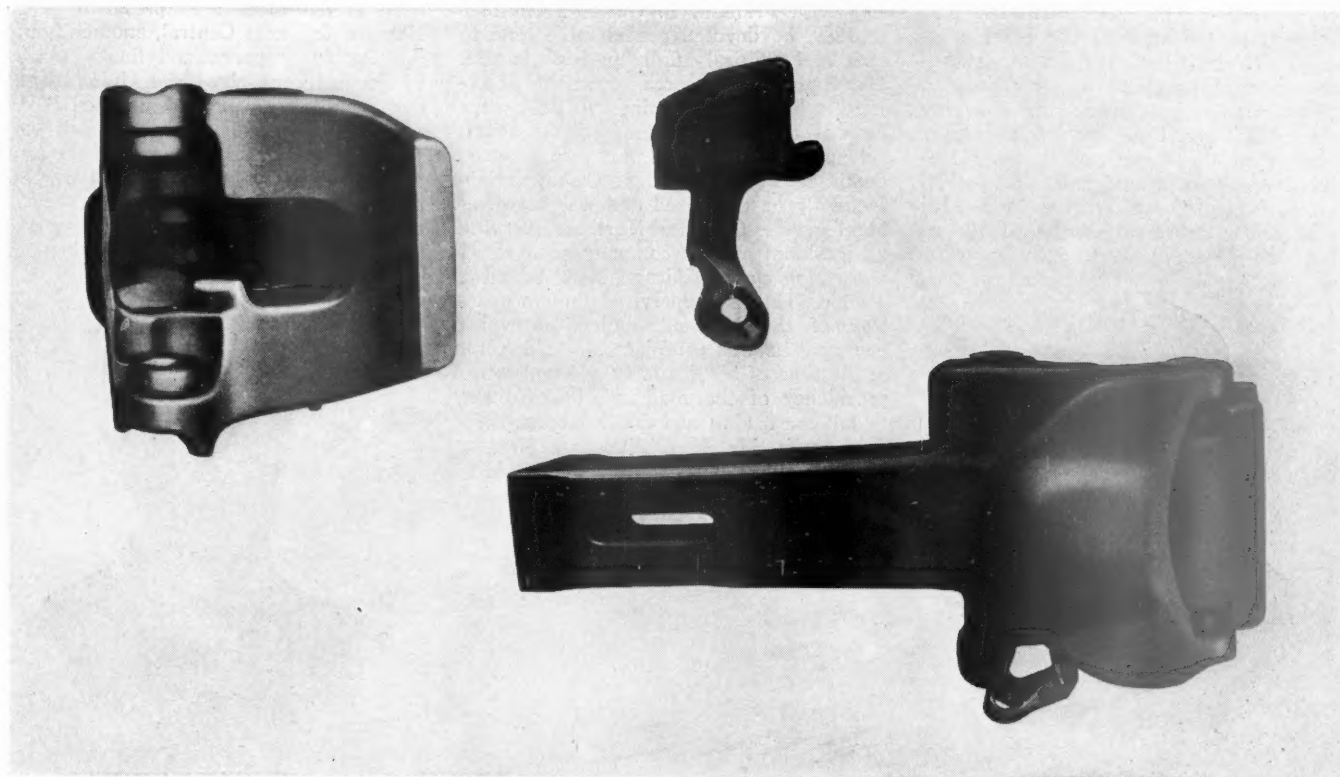
**W. C. Perkins**, roadmaster on the Dillon district of the Utah division of the Oregon Short Line with headquarters at Dillon, Mont., has been promoted to division engineer of the Kansas division of the Union Pacific Railroad, with headquarters at Kansas City, Mo., succeeding **A. R. Jurden**. Both roads are units of the Union Pacific System.

Following the consolidation of the First and Second districts of the Chicago, Rock Island & Pacific, **F. T. Beckett**, district engineer maintenance of way of the Second district, with headquarters at El Reno, Okla., has been appointed to the newly-created position of engineer maintenance of way of the system, with headquarters at Kansas City, Mo., and the position of district engineer maintenance of way at El Reno has been discontinued. The position of district engineer maintenance of way of the First district, which has been held by **L. J. Hughes**, with headquarters at Des Moines, Iowa, has also been abolished. **C. M. Duffy**, assistant signal engineer of the First district, with headquarters at Des Moines, has been transferred to Kansas City, with jurisdiction over the system. The positions of assistant signal engineer at Des Moines and of the Second district at El Reno, which has been held by **C. E. Hartvig**, have been abolished.

**W. C. Cushing**, formerly engineer of standards of the Pennsylvania, with headquarters at Philadelphia, Pa., who retired on May 31, after more than 44 years of railway service, was born at St. John, N. B., on March 18, 1863. After attending the University of New Brunswick (B. A., 1884; M. A., 1886), and Massachusetts Institute of Technology (B. Sc. in Civil Engineering, 1887), he obtained his first railway position as a rodman in the engineering corps of the Jeffersonville, Madison & Indianapolis (now part of the Pennsylvania), serving in that capacity from 1887 to 1889. In the latter year he became engineer maintenance of way on the Cincinnati & Muskingum Valley (now also part of the Pennsylvania), continuing as division engineer on the Pennsylvania from 1890 to January, 1901. For the next two years he served successively as superintendent of the Pennsylvania's Panhandle and Eastern divisions, being then appointed chief engineer maintenance of way of the Southwest System. In 1918 he took over the same position on the Pennsylvania



# THE NEW A.R.A. STANDARD "E" COUPLER



## GREATER STRENGTH at VITAL POINTS

**I**MPROVED DESIGN of the new A.R.A. standard "E" coupler gives greater strength at vital points. This adds to the life of the coupler and reduces repairs and replacements.

The type "E" coupler has a stronger knuckle side wall to reduce damage from buffing blows by the knuckle tail. The front face of the "E" coupler has been made materially stronger to reduce possible damage at this point. The lock leg has been increased in cross sectional area 28% and new design of knuckle and lock leg provides added sup-

port for this member. The shank of the type "E" coupler is  $6\frac{1}{4}$  inches deep against a depth of 6 inches in the "D" coupler. The cross sectional area of the "E" shank is 11.4% to 26.5% greater at various points than in the "D" shank.

This increase in strength at vital points is assurance of longer life and freedom from repairs.

Details of the new A.R.A. standard "E" coupler will be furnished on request to the manufacturers.

• This is the second in a series of announcements regarding the new A.R.A. standard "E" coupler.

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Lines West of Pittsburgh, and in 1920 he was appointed engineer of standards. In this position, which he held at the time of his retirement, he was attached to the staff of the chief engineer, with jurisdiction over the standardization of practices and methods in the maintenance of track and roadway structures. Mr. Cushing was a charter member of the American Railway Engineering Association, and has served that association as a director, 1905-1917; as second vice-president, 1909-1910; as first vice-president, 1910-1911; as presi-



W. C. Cushing

dent, 1911-1912; and as chairman of various special committees and of the standing committee on rail. He was a delegate to three sessions of the International Railway Congress, and is a member of several national and international railway and engineering societies.

## OBITUARY

**Walter E. Jestila**, manager of the Union Pacific Magazine, with headquarters at Omaha, Neb., died on June 5, as the result of a heart attack.

**C. B. Sauls**, division storekeeper on the Illinois Central, with headquarters at McComb, Miss., died on June 19, as the result of injuries received in an accident.

**Arthur F. Currier**, formerly superintendent of car service of the New York, New Haven & Hartford, died recently at New Haven, Conn., at the age of 75 years. Mr. Currier was identified with the pioneer efforts of the Old Colony (now part of the New Haven), commencing his railroad career as a clerk in 1873.

### C. E. Ingersoll, President of Midland Valley, Dies

Charles E. Ingersoll, president of the Midland Valley, the Kansas, Oklahoma & Gulf and the Oklahoma City-Ada-Atoka, died of a heart attack, following a long illness, at Philadelphia, Pa., on June 6. Mr. Ingersoll, who was born at Philadelphia on June 17, 1860, was graduated from the University of Pennsylvania with an A. B. degree in 1882 and was admitted

to the Pennsylvania bar two years later. During his subsequent period of active law practice, which included a partnership with Franklin B. Gowen from 1885 to 1889, he devoted considerable time to civic and political affairs in Philadelphia. Mr. Ingersoll first became actively interested in the railroad business in 1907, when he was elected a director of the Pennsylvania to fill the place left vacant by the death of President A. J. Cassatt. Subsequently he organized and was active in building the Choctaw Northern, serving as president of that company prior to its absorption by the Chicago, Rock Island & Pacific. He also supervised the construction of the Midland Valley, of which company he was president and a director at the time of his death. In addition to his presidency of that road and of the Kansas, Oklahoma & Gulf and the Oklahoma City-Ada-Atoka, Mr. Ingersoll was a director of both the Pennsylvania and the Missouri Pacific. His interests also included interurban electric lines, for at the time



C. E. Ingersoll

of his death he was a director of the Philadelphia & Western, and until about six months ago had served as president and director of the North Pennsylvania Railroad Company.

### Robert S. Lovett, Union Pacific Chairman, Dies

Judge Robert S. Lovett, chairman of the board of the Union Pacific System, died at the Harkness Pavilion at the Medical Center, New York City, on June 19, following an operation performed several days earlier.

Judge Lovett, who had directed the affairs of the Union Pacific system since the death of E. H. Harriman in 1909, was born on a farm near San Jacinto, Tex., on June 22, 1860, and as a boy worked at one time on the construction of the Houston East & West Texas (now part of the Southern Pacific, Texas & Louisiana Lines). He received his education at high school in Houston, Tex., and later studied law in the office of Charles Stewart. Admitted to the bar in 1882, he began the practice of law in Cold Springs, Tex., and two years later started to handle local cases for the Houston East & West Texas. In 1889 he became assistant general attorney and general counsel of the Texas & Pacific, returning to the Southern Pacific interests as general

counsel of the Southern Pacific Lines in Texas, while a member of the law firm of Baker, Botts, Baker & Lovett. This position led to that of president of the Houston & Texas Central, another Southern Pacific property, and finally to that of general counsel of the Union Pacific and Southern Pacific and affiliated Harriman lines. In 1904 he was elected vice-president and general counsel of the same roads, and on September 13, 1909, was advanced to chairman of the executive committee of both systems, holding that position until January, 1913, when the



Robert S. Lovett

relations of the Union Pacific and the Southern Pacific were dissolved by order of the United States Supreme Court. He then continued as chairman of the executive committee of the Union Pacific System, including the Union Pacific Railroad, the Oregon Short Line, the Oregon-Washington Railroad & Navigation Company, the Los Angeles & Salt Lake and the St. Joseph & Grand Island. During the war he headed the priorities committee of the War Industries Board for a time, and was then appointed director of the division of capital expenditures of the United States Railroad Administration. He served as president of the Union Pacific System for a short while in 1919, and in the next year, when the railways were returned to private management, was elected chairman of the board, being succeeded in the presidency by Carl Gray. Poor health and advancing years eventually forced Judge Lovett to relinquish many of the active details of management, and on January 1, 1924, he retired from the chairmanship of the railroad's executive committee, but continued as chairman of the board until the time of his death.

THE HOUSE OF REPRESENTATIVES ON June 21 adopted a resolution providing for an investigation by the committee on post-offices and post roads with a view to ascertaining, among other things, whether the contracts entered into by the Post-office Department for the carrying of mail, by air service, railroad, or steamship, are excessive and to what extent they should be reduced. The investigation also is to inclose postoffice leases and various contracts entered into by the department.





TYPE  
403

## WAUGH-GOULD DRAFT GEAR RECEIVES A.R.A. CERTIFICATE No. 1



### WAUGH EQUIPMENT COMPANY

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# Annual Report of the New York Central Railroad Company

To the Stockholders of

## THE NEW YORK CENTRAL RAILROAD COMPANY

The Board of Directors herewith submits its report for the year ended December 31, 1931, with statements showing the income account and the financial condition of the company.

### The Year's Business

The increased depression in general business conditions during the year is reflected in the large decreases in freight and passenger traffic and in the revenue therefrom. Operating revenues were \$382,190,182.89, a decrease of \$96,728,164.66 (20.20%).

Revenue freight amounted to 113,945,490 tons, a decrease of 36,100,789 tons (24.06%), the revenue therefrom being \$245,897,087.34, a decrease of \$61,280,487.95 (19.95%).

The company carried 63,166,911 revenue passengers, a decrease of 9,784,104, these losses being distributed: interline passengers 1,012,871, a decrease of 29.77%, local passengers 3,874,136, a decrease of 20.38%, and commutation passengers 4,897,097, a decrease of 9.69%. The revenue received from passenger business amounted to \$86,304,507.96, a decrease of \$24,880,236.86 (22.38%).

Net railway operating income was \$28,075,578.56, a decrease of \$29,159,948.81; while net income amounted to \$2,430,101.13, a decrease of \$33,551,690.74.

### Income Account for the Year

Including Boston & Albany Railroad, Ohio Central Lines, Michigan Central Lines, and Big Four Lines. (Results for January, 1930, as to the roads covered by the leases effective February 1, 1930, are included for purposes of comparison).

	Year ended Dec. 31, 1931	Year ended Dec. 31, 1930	+Increase —Decrease
<b>OPERATING INCOME</b>			
RAILWAY OPERATIONS	11,388.48 miles operated	11,421.55 miles operated	33.07 miles
Railway operating revenues	\$382,190,182.89	\$478,918,347.55	—\$96,728,164.66
Railway operating expenses	307,065,680.57	376,729,417.97	—69,663,737.40
<b>NET REVENUE FROM RAILWAY OPERATIONS</b>	\$75,124,502.32	\$102,188,929.58	—\$27,064,427.26
<b>Percentage of expenses to revenues</b>	(80.34)	(78.66)	+
Railway tax accruals	\$32,215,328.92	\$34,009,020.80	—\$1,793,691.88
Uncollectible railway revenues	102,942.29	125,750.30	—22,808.01
<b>RAILWAY OPERATING INCOME</b>	\$42,806,231.11	\$68,054,158.48	—\$25,247,927.37
Equipment rents, net debit	\$11,772,767.61	\$10,288,151.34	+
Joint facility rents, net debit	2,957,884.94	530,479.77	+
<b>NET RAILWAY OPERATING INCOME</b>	\$28,075,578.56	\$57,235,527.37	—\$29,159,948.81
<b>MISCELLANEOUS OPERATIONS</b>			
Revenues	\$909,761.13	\$999,418.80	—\$89,657.67
Expenses and taxes	828,709.31	963,296.74	—134,587.43
<b>MISCELLANEOUS OPERATING INCOME</b>	\$81,051.82	\$36,122.06	+
<b>TOTAL OPERATING INCOME</b>	\$28,156,630.38	\$57,271,649.43	—\$29,115,019.05
<b>NON-OPERATING INCOME</b>			
Income from lease of road	\$162,612.99	\$164,397.38	—
Miscellaneous rent income	5,993,993.85	5,887,457.91	+
Miscellaneous non-operating physical property	3,664,353.75	3,448,361.23	+
Separately operated properties—profit	336,321.20	2,003,285.39	—1,666,964.19
Dividend income	16,143,262.36	14,916,581.73	+
Income from funded securities and accounts	5,504,934.06	6,045,985.10	—541,051.04
Income from unfunded securities and accounts	3,566,470.35	4,377,680.68	—811,210.33
Income from sinking and other reserve funds	187,565.87	211,044.92	—23,479.05
Release of premiums on funded debt	31,056.76	—	+
Miscellaneous income	144,670.01	2,672,189.25	—2,527,519.24
<b>TOTAL NON-OPERATING INCOME</b>	\$35,735,241.20	\$39,726,983.59	—\$3,991,742.39
<b>GROSS INCOME</b>	\$63,891,871.58	\$96,998,633.02	—\$33,106,761.44

	Year ended Dec. 31, 1931	Year ended Dec. 31, 1930	+Increase —Decrease
<b>DEDUCTIONS FROM GROSS INCOME</b>			
Rent for leased roads	\$26,383,108.64	\$27,762,047.27	—\$1,378,938.63
Miscellaneous rents	1,495,709.56	1,523,115.86	—27,406.30
Miscellaneous tax accruals	1,936,442.32	2,097,182.75	—160,740.43
Separately operated properties—loss	114,193.86	148,657.42	—34,463.56
Interest on funded debt	28,159,311.42	27,217,659.95	+
Interest on unfunded debt	2,067,979.83	1,414,406.50	+
Amortization of discount on funded debt	508,949.31	539,844.68	—30,895.37
Maintenance of investment organization	14,922.25	35,277.11	—20,354.86
Miscellaneous income charges	781,153.26	278,649.61	+
<b>TOTAL DEDUCTIONS FROM GROSS INCOME</b>	\$61,461,770.45	\$61,016,841.15	+
<b>NET INCOME</b>	\$2,430,101.13	\$35,981,791.87	—\$33,551,690.74
<b>Per cent to capital stock outstanding</b>	(.49)	(7.21)	—
<b>DISPOSITION OF NET INCOME</b>			
Sinking and other reserve funds	\$119,913.33	\$91,087.02	+
Income appropriated for investment in physical property	100.00	—	+
Miscellaneous appropriations of income	833.46	—	+
<b>TOTAL APPROPRIATIONS OF INCOME</b>	\$120,846.79	\$91,087.02	+
<b>SURPLUS FOR THE YEAR</b>	\$2,309,254.34	\$35,890,704.85	—\$33,581,450.51
Dividends declared during the year	\$19,970,304.81	\$39,940,593.60	—\$19,970,288.79

### Profit and Loss Account

BALANCE TO CREDIT OF PROFIT AND LOSS, DECEMBER 31, 1930	\$286,783,925.88
<b>ADDITIONS:</b>	
Surplus for the year 1931	\$2,309,254.34
Profit on securities sold (net)	160,627.91
Profit on property sold (net)	54,197.48
Sundry adjustments (net), unrefundable overcharges and uncollectible accounts	416,869.80
	\$289,724,875.41
<b>DEDUCTIONS:</b>	
Dividend appropriations of surplus	\$19,970,304.81
Depreciation prior to July 1, 1907, on equipment retired during the year	145,395.22
Loss on property retired	1,917,339.89
	\$22,033,039.92
BALANCE TO CREDIT OF PROFIT AND LOSS, DECEMBER 31, 1931	\$267,691,835.49

### Operating Expenses

Operating expenses were as follows:

Group	Amount	Increase	Decrease
Maintenance of way and structures	\$48,391,853.11		\$16,441,042.40
Maintenance of equipment	81,509,925.10		22,247,468.21
Traffic expenses	8,862,830.48		731,485.01
Transportation expenses	146,301,548.92		28,153,482.23
Miscellaneous operations	6,250,567.43		1,897,567.80
General expenses	15,997,500.73		666,845.35
Transportation for investment—credit	248,545.20	\$474,153.60	
<b>Total</b>	\$307,065,680.57		\$69,663,737.40

After a continuous service of forty-two years with The New York Central Railroad Company and its predecessors, Patrick E. Crowley, on November 11, 1931, tendered his resignation as President of the Company to become effective January 1, 1932. Mr. Crowley will continue as a Director and member of the Executive Committee and will also serve the Company in an advisory capacity.

December 9, 1931:

Frederick E. Williamson was elected President of the Company, effective January 1, 1932, and also a Director and member of the Executive Committee.

The Board wishes to express its appreciation of the loyal and efficient service of the officers and employees of the company during the year.

For the Board of Directors,  
E. F. STEPHENSON,  
Secretary.

[ADVERTISEMENT]



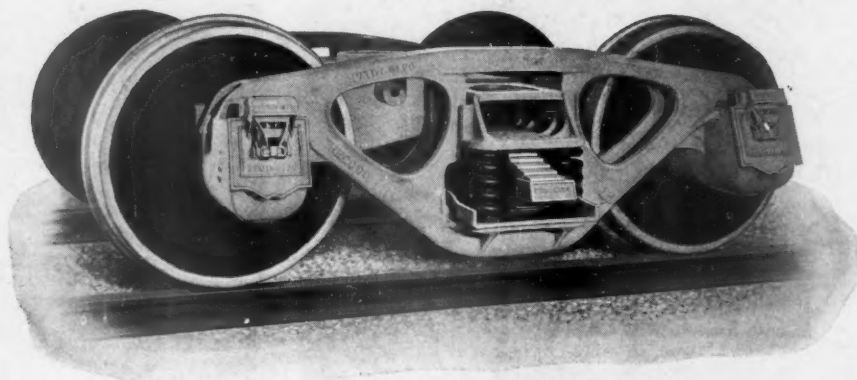
JUNE 25, 1932

JUN 26 1932

# Railway Age

FOUNDED IN 1856

## THE SYMINGTON DOUBLE TRUSS TRUCK



Accommodates Without Change

## SYMINGTON COIL ELLIPTIC SPRINGS

Patented and Patents Pending

**Bolster Adequately Supported in Both Directions  
Reduces Spring Breakage  
Simplifies Shimming**

**May be Obtained from the Following  
Licensed Manufacturers**

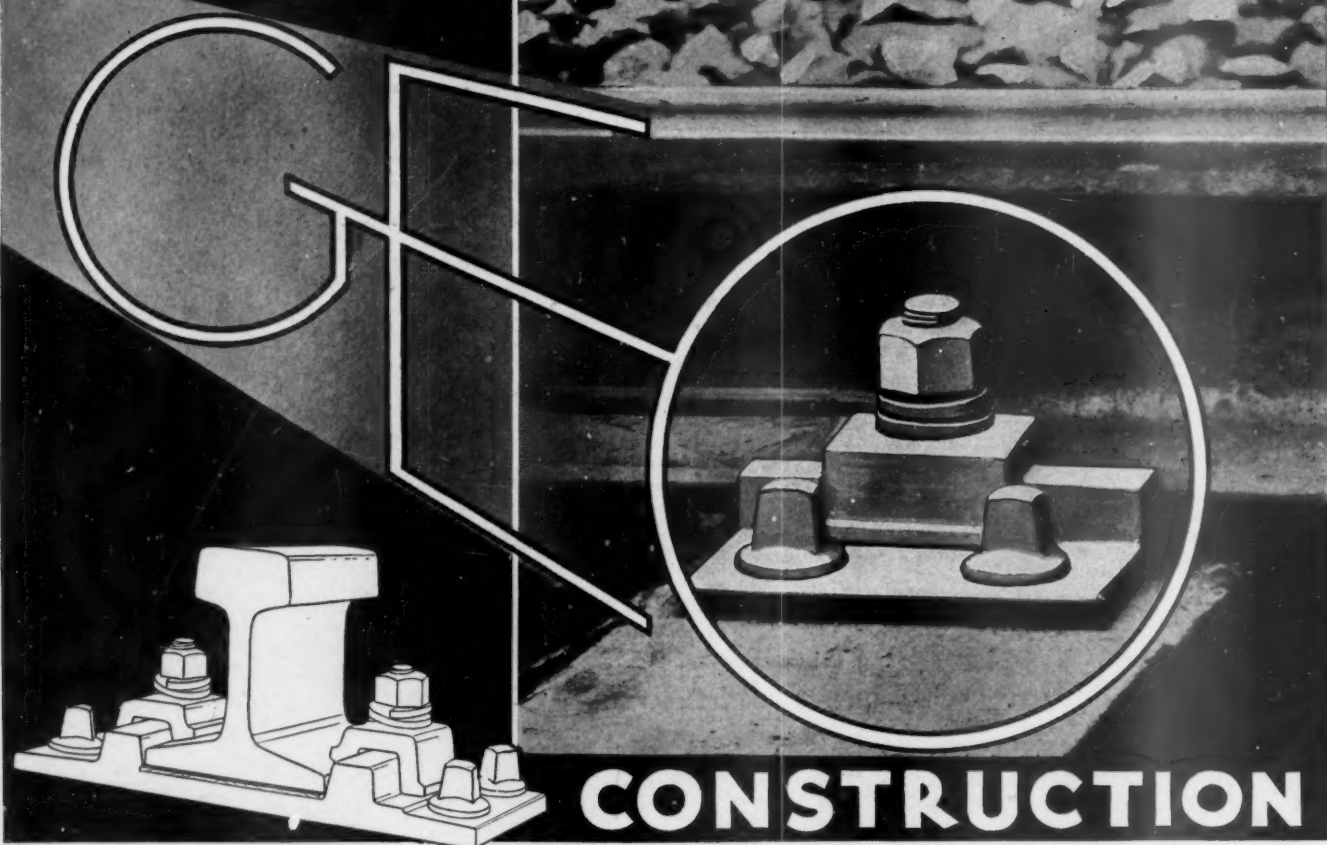
AMERICAN STEEL FOUNDRIES  
THE BETTENDORF CO.  
THE BUCKEYE STEEL CASTINGS CO.

THE GOULD COUPLER CO.  
SCULLIN STEEL CO.  
ADANAC SUPPLIES, Ltd., CANADA

**THE SYMINGTON COMPANY**

*See page #15*

Compare  
*This*  
with



**CONSTRUCTION**

**GEO** Track Construction is not new and untried. Service reports conclusively prove its merit, and a trial installation will convince you. If you do not have a copy, ask for the new **GEO Bulletin No. 2** ' ' '

**CARNEGIE STEEL COMPANY • PITTSBURGH**

*Subsidiary of United States Steel Corporation*

181





# MINER



Every  
**DRAFT  
GEAR**

Drop Hammer Tested Before Shipment

**W. H. MINER, INC. CHICAGO**

# Air Conditioning

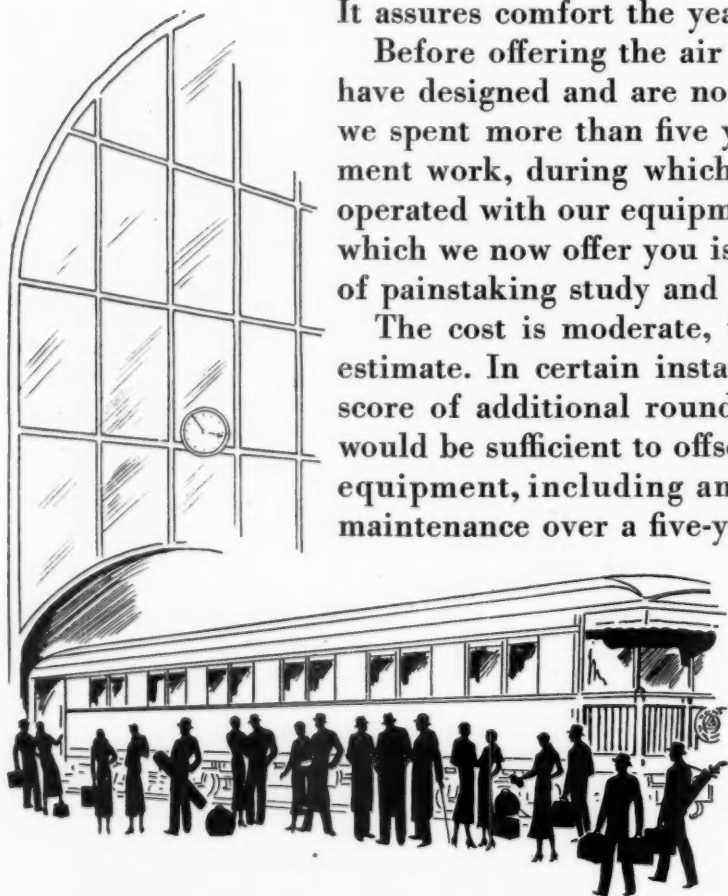
assures  
clean, comfortable  
and noiseless travel

**A**IR conditioning is offered to railroad executives as an important contribution to the comfort of passengers. It operates to maintain the most agreeable atmospheric conditions and to do this regardless of climate or weather. It assures comfort the year round.

Before offering the air conditioning system which we have designed and are now installing on passenger cars, we spent more than five years in research and development work, during which time experimental cars were operated with our equipment in service. The equipment which we now offer you is the result of this long period of painstaking study and development.

The cost is moderate, probably less than you would estimate. In certain instances under survey, less than a score of additional round trip passenger fares per year would be sufficient to offset the total annual cost of this equipment, including amortization, depreciation and maintenance over a five-year period.

We are glad to supply complete information as to the nature of this equipment, how it operates and its adaptability to any type of car.



## PULLMAN CAR & MANUFACTURING CORPORATION

General Offices: Chicago, Illinois

*Pacific Coast Sales Office:*

RUSS BUILDING  
San Francisco, Cal.

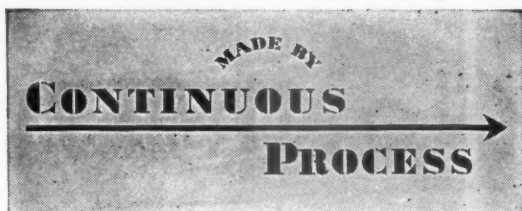
*Washington Sales Office:*

MUNSEY BUILDING  
Washington, D. C.

*Birmingham Sales Office:*

WEBB CRAWFORD BUILDING  
Birmingham, Ala.





**"Pioneers in Continuous Sheet Rolling"**

*Your investment in sheets, plates and wheels can be made to yield greater profits. Here is a way that many railroads have found inexpensive, and free from speculative risk.*

**P**ERHAPS you haven't associated increased earnings for your railroad with the iron and steel you buy for equipment and construction. Yet, every dollar saved by efficiency in the shop, or by longer service and less frequent shoppings of your equipment, means greater profits for your road.

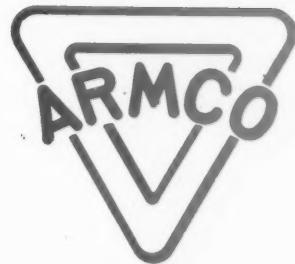
You can multiply this dollar many times over a long period by using Armco sheets, plates and wrought steel wheels. Each of these carefully made products is designed to give the longest service at the lowest possible cost. And this includes both first cost and maintenance while in service.

We have studied the metal needs of railroads for many years. First-hand knowledge of users' needs

has convinced us that no one grade of metal will meet every requirement *economically*.

That is why you will find so many different grades of iron and steel among Armco products—smooth, cold-rolled, rust-resisting sheets for locomotive jackets; dense, smooth-surfaced sheets for passenger train cars; durable iron plates for freight train cars; lasting galvanized sheets for refrigerator cars and many other uses; and wrought steel wheels that meet the highest standards of safety, efficiency and dependable performance.

We shall be glad to explain more fully how Armco railroad products can save you both time and money. Just write to the nearest office.



BEHIND THIS SYMBOL is the valuable experience and constant research of a company that has served the exacting metal needs of railroads for more than a generation. Let the Armco triangle be your guide in purchasing sheet metal, plates, pipe, and car wheels for exacting service.

## **ARMCO RAILROAD SALES CO.**

**Executive Offices: MIDDLETOWN, OHIO**

**DISTRICT OFFICES:**

**New York . Chicago . Philadelphia . Cleveland . St. Louis**

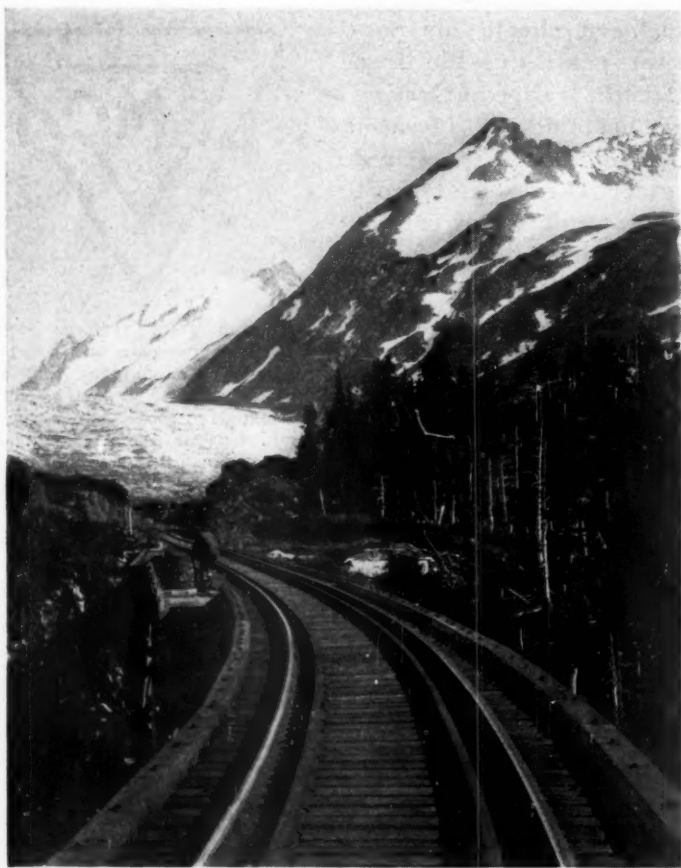
**ARMCO**  
IRON AND STEEL  
**SHEETS** *FOR EXACTING*  
RAILROAD USES **PLATES**

# In the Far North



4-8-2 Type Locomotive for The Alaska Railroad

Cylinders	22" x 30"	Steam Pressure	220 lb.	Superheating Surface	706 Sq. Ft.	Tractive Force—	
Drivers, Diameter	63"	Grate Area	62.5 Sq. Ft.	Weight on Drivers	190,000 lb.	Main Cylinders	43,100 lb.
Boiler, Diameter	72"	Water Heating Surface	2991 Sq. Ft.	Weight, Total Engine	272,000 lb.	With Booster	54,900 lb.



A Bit of Alaska R. R. Scenery

The Alaska Railroad, owned and operated by the United States Government, is placing in service a new Baldwin locomotive of the 4-8-2 type. This engine is designed for operation on grades up to 2.2 per cent, and curves as sharp as 16 degrees. Service conditions are severe, especially in winter, when intense cold is encountered. Maximum reliability is required of every detail, and therefore ELFUR IRON is used for the cylinder and valve chamber bushings.

THE BALDWIN LOCOMOTIVE WORKS  
PHILADELPHIA



# Filling the Ladle

with



ELECTRIC  
FURNACE  
IRON

Uniform consistency,  
from high-grade mix-  
ture and uniformly con-  
trolled temperature.

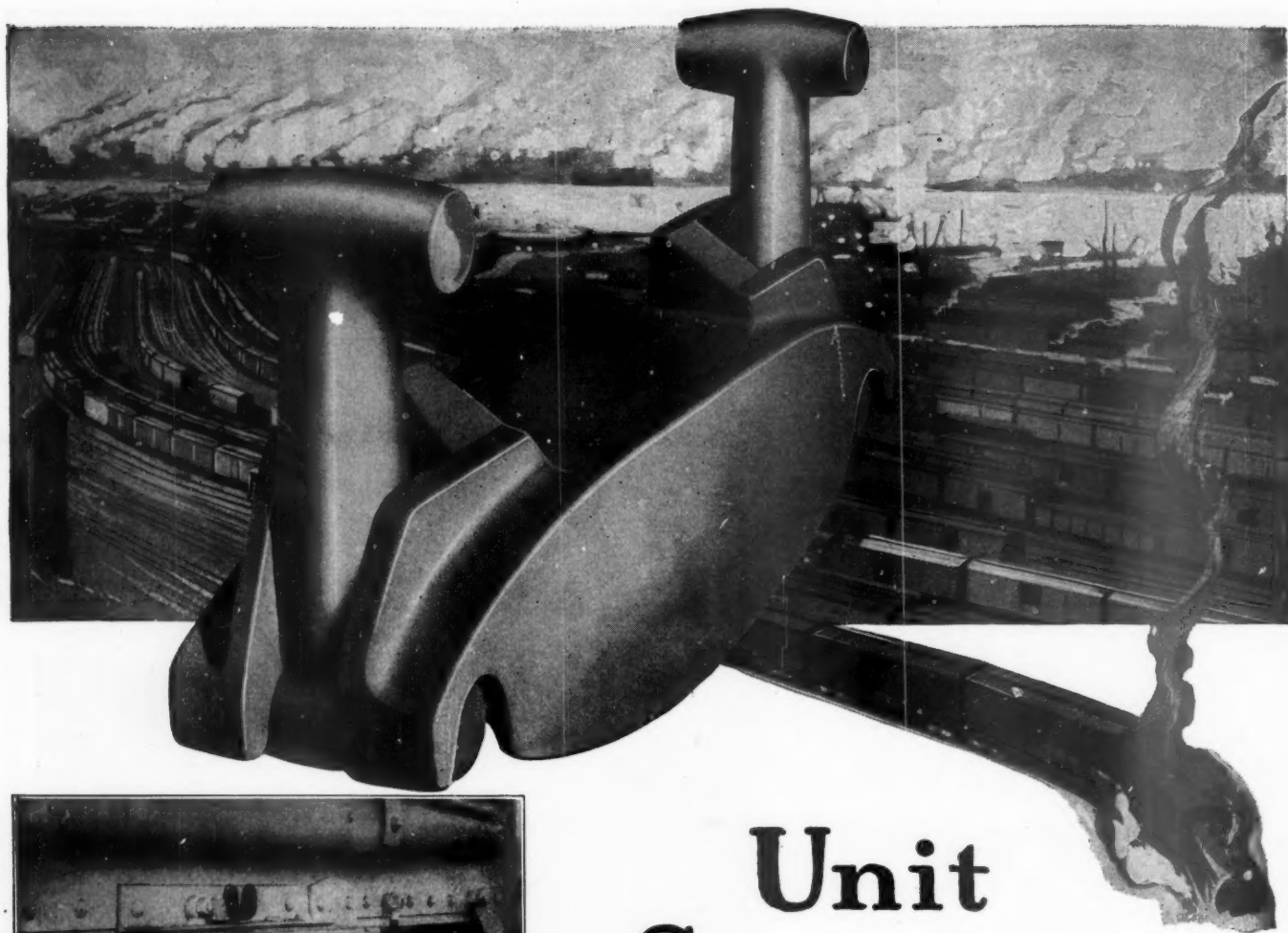


This iron will be poured into molds  
and cast into Locomotive Wearing Parts.

FOUNDRIES DIVISION

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA



## Unit Structure

The striking casting has an integral bottom tie forming a unit structure in which is mounted the swinging Union Centering Device. Together they give the necessary movable coupler support with the solid center sill bottom tie.

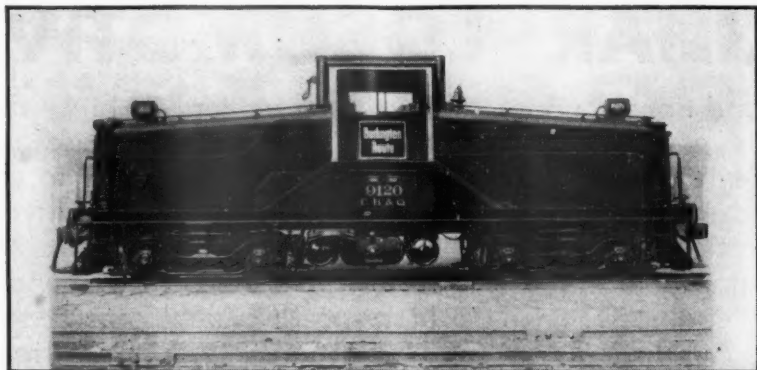
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**UNION METAL PRODUCTS COMPANY****NEW YORK · CHICAGO ·****ST. LOUIS · WASHINGTON****RICHMOND · HOUSTON · SAN FRANCISCO · KANSAS CITY · MONTREAL**

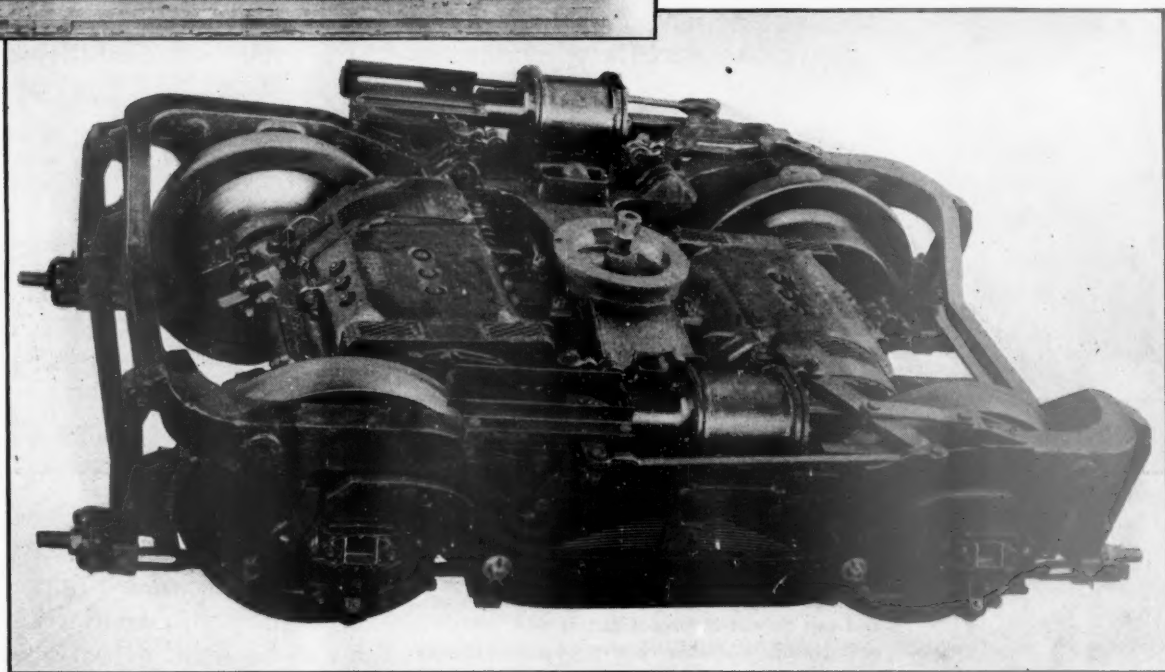
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# A NEW DESIGN OF QUICK-ACTING CLASP BRAKE



This gas-electric locomotive in service on the C. B. & Q. R. R. is equipped with American Steel Foundries' Unit Cylinder Quick-Acting Clasp Brake.



Each truck carries two air brake cylinders mounted on the truck frame, eliminating all foundation brake connections from the body of the car.

The use of quick-acting unit cylinder brakes on all types of passenger equipment permits faster, closer schedules by increasing the limit of safe speed and making control positive and dependable.

Simplex Unit Cylinder Brakes - skillfully engineered and built to precision standards - make a new definite contribution to efficient, economical and profitable operation in passenger service.

## AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

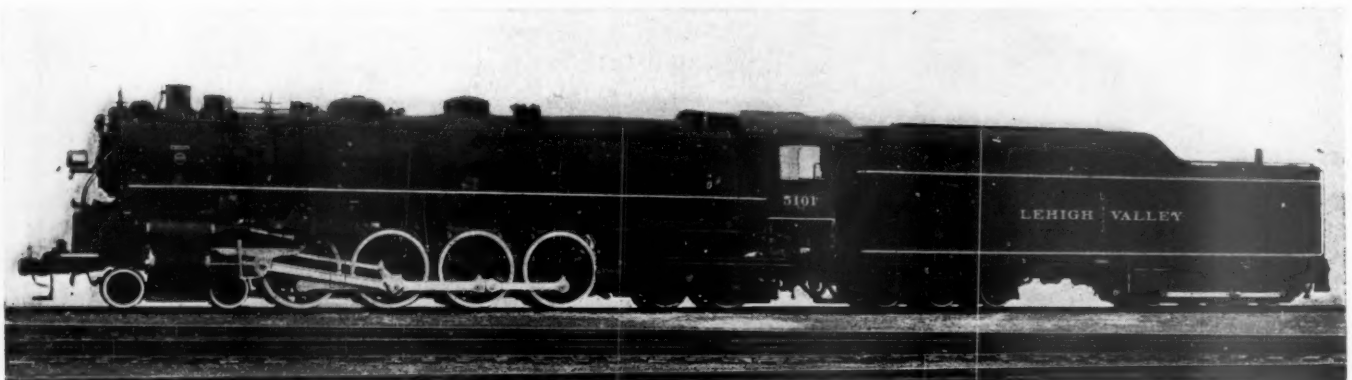
ST. LOUIS

# The Call for economy is a Call for the **AUXILIAR LOCOMOTIVE**

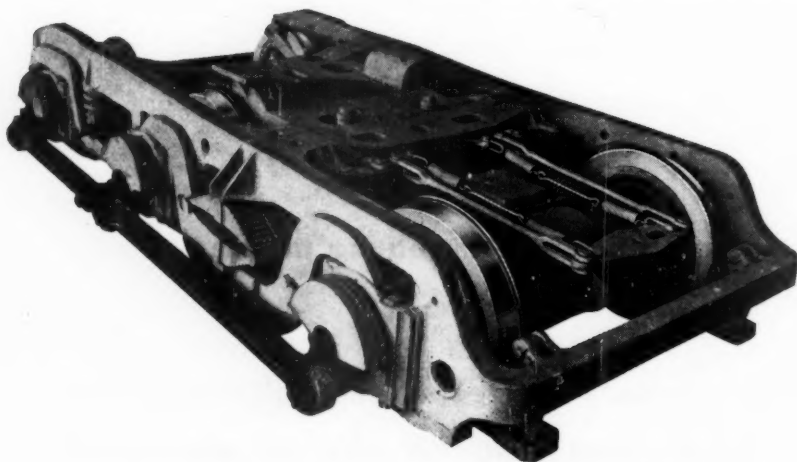
**P**RESENT conditions, under which it is essential that the highest degree of efficiency be realized in every phase of railway operation, bring out fully the advantages of having motive power equipped with the Bethlehem Auxiliary Locomotive. An Auxiliary Locomotive

under the tender of a high-wheel engine greatly increases its efficiency by enabling it to start and handle, under difficult conditions, trains heavy enough to make full use of its tremendous high-speed hauling capacity.

Additional economies result from the availability of this one



The Bethlehem Auxiliary Locomotive is made in both four- and six-wheel types. It is readily installed in place of one of the tender trucks and can be cut in or cut out at will, providing an instantly available reserve of tractive force.



## BETHLEHEM



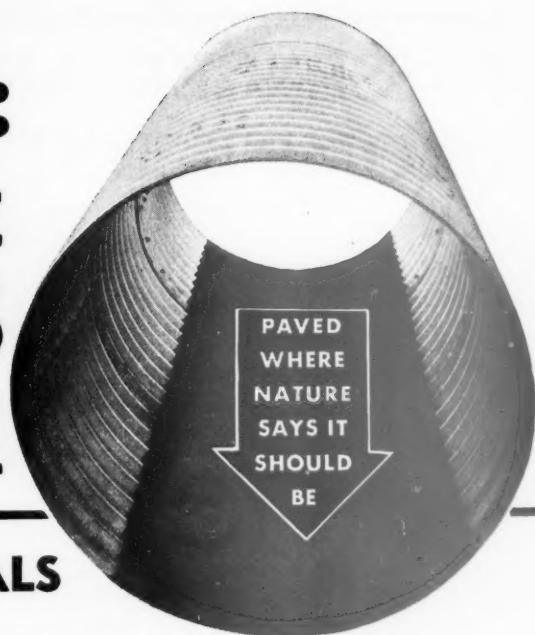
class of motive power for all classes of service, as the high-wheel engine equipped with the Bethlehem Auxiliary Locomotive can be used effectively in either slow-freight or passenger service if convenience or necessity so dictates. This means that the necessary capital investment in motive power is very much reduced and standby losses are cut down. In many cases the increase in hauling capacity of high-wheel engines which results from installing Auxiliaries enables a road to meet growing demand for fast-freight service with existing locomotives.

**BETHLEHEM STEEL COMPANY**  
General Offices: Bethlehem, Pa.

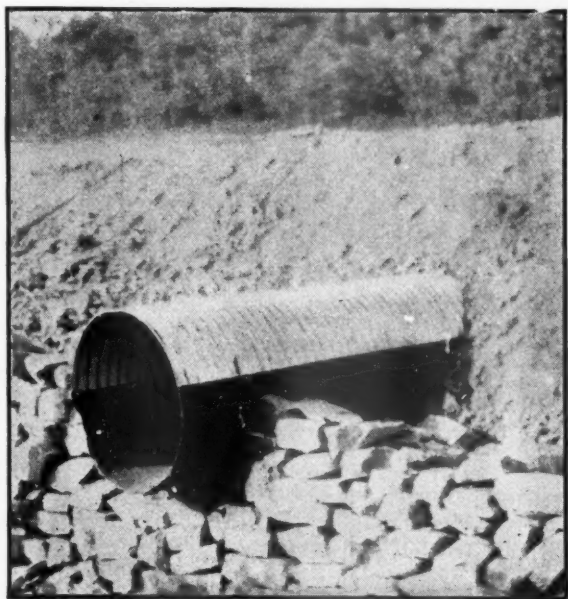
**District Offices:** New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Buffalo, Pittsburgh, Cleveland, Cincinnati, Detroit, Chicago, St. Louis. **Pacific Coast Distributor:** Pacific Coast Steel Corporation, San Francisco, Seattle, Los Angeles, Portland, and Honolulu. **Export Distributor:** Bethlehem Steel Export Corporation, New York.



# NATURE SAYS: These Culvert FEATURES Are Essential



## HUNDREDS OF RAILROAD OFFICIALS AND ENGINEERS AGREE



30" Armco Paved Invert Culvert  
under a road in Tennessee.



72" Armco Paved Invert Culvert  
in North Carolina.

**NATURE SAYS:** that a culvert must be strong in order to withstand pressure, impact, frost. This you get in Armco Paved Invert Pipe because of the corrugated metal type.

**NATURE SAYS:** that a culvert must be durable in order to withstand disintegrating effects of soil and water. If it breaks, cracks or disjoints, it has already failed even before possible disintegration of material sets in.

Armco Paved Invert Pipe cannot break or disjoint and the base metal (Armco Ingot Iron) has an unequalled record of 26 years to date.

**NATURE SAYS:** that protection is needed in the bottom. Witness the fact that culverts wear out in the bottom. Only Armco Paved Invert Pipe gives you this protection in the bottom—a thick, tough, bituminous pavement.

Only Armco Paved Invert Pipe has all of these culvert features which Nature says are so essential to economical and satisfactory culvert service.

Inspect your culverts now or let an Armco man bring an inspection trip to you. Know the facts as Nature records them. Also send for complete facts about Armco Paved Invert Culverts.

*Armco culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand.*

## MAIL COUPON TODAY

Gentlemen:

Send me complete data on Armco Paved Invert Culverts.

NAME .....

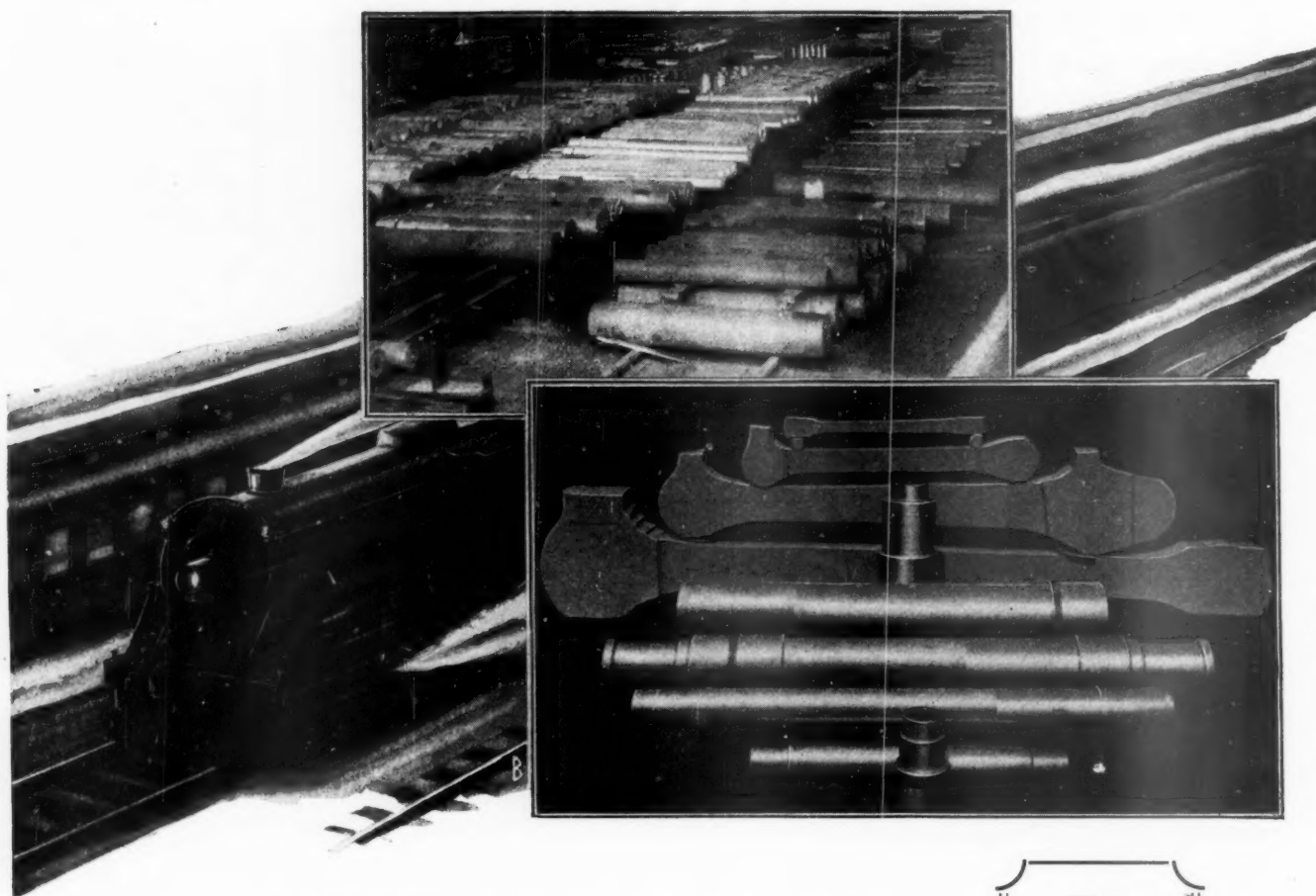
TITLE .....

ROAD .....

ADDRESS ..... R.A. 6-25

**ARMCO**  
**PAVED INVERT** *Pipe*  
ARMCO CULVERT MANUFACTURERS ASSOCIATION  
Middletown, Ohio

## PASSENGER AND SHIPPER BOTH WANT PROMPT UNINTERRUPTED SERVICE



**S**ERVICE depends on both human and mechanical factors. It is the human factor in the Standard Steel Works plant which gives mechanical dependability to all Standard Steel Works Parts. Our force is trained by long experience and held to full responsibility in every process that converts a raw material into a finished part. "Standard" parts, therefore, play no small part in building and in holding business for both the freight and passenger divisions of your road.

Tires  
Rolled  
Wheels  
Steel Tired  
Wheels  
Forgings  
Steel  
Castings  
Billets



## STANDARD STEEL WORKS COMPANY

Subsidiary of The Baldwin Locomotive Works.

**GENERAL OFFICES & WORKS: BURNHAM, PENNA.**

CHICAGO ST. LOUIS PORTLAND  
NEW YORK SAN FRANCISCO PHILADELPHIA AKRON



# SYMINGTON

## COIL-ELLIPTIC

## TRUCK SPRINGS

Patented and Patents Pending

### REDUCE DAMAGE

to Road-bed, Lading and Car Structure  
by Preventing the

## SEVERE CONTINUOUS BOUNCING

of Freight Cars at Critical Speeds

Provides Controlled Non-harmonic  
Group Action for the Life of the  
Springs Without Loss of Capacity

No Friction Parts to Wear

THE SYMINGTON COMPANY



FOR NEW TRUCKS  
SEE FRONT COVER



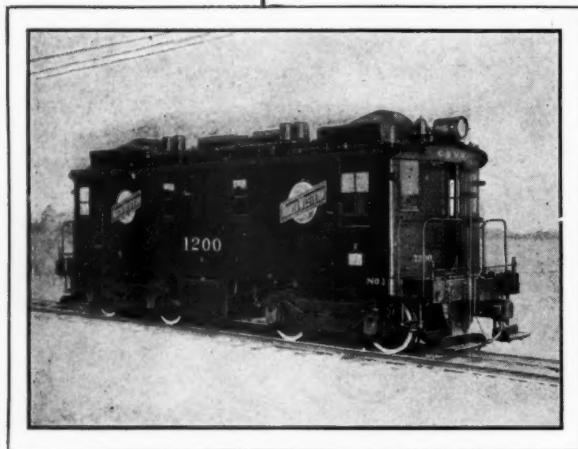
FOR EXISTING TRUCKS

# OIL-ELECTRIC LOCOMOTIVES

## Cut Switching Costs for the C & NW

Savings made (compared with steam operation) by oil-electric locomotives during 1931

Engine	Hp.	Hours operated	Saving
No. 1002	300	6,417	\$16,360
No. 1001	300	5,089	\$10,323
No. 1000	300	4,116	\$ 5,224
No. 1200	600	5,264	\$10,090



**T**HE Chicago & North Western installed three 300-hp. G-E equipped oil-electric locomotives more than five years ago. A fourth, of 600 hp., has been in service more than a year.

These locomotives are given periodic inspection without interruption of service; and, once a year or more, thorough inspection with minor repairs.

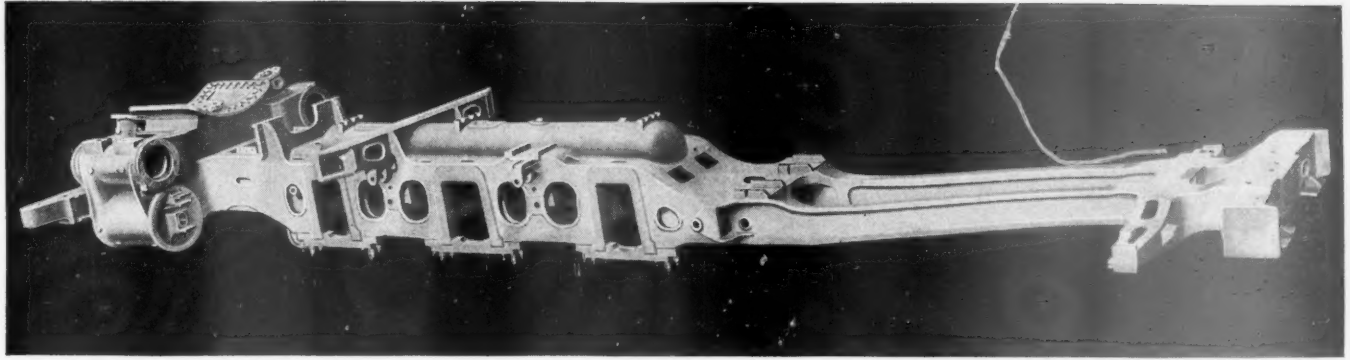
Nevertheless, general repairs, including the extensive renewal of engine parts, have not been necessary, even on the oldest locomotives.

Nearly 90 per cent of the oil-electrics in service in the United States are G-E equipped. Whatever your switching requirements, you will find it advantageous to investigate G-E oil-electrics—as the C & NW did. Address the G-E office nearest you or General Electric Company, Schenectady, N. Y.

J55-4

# GENERAL ELECTRIC



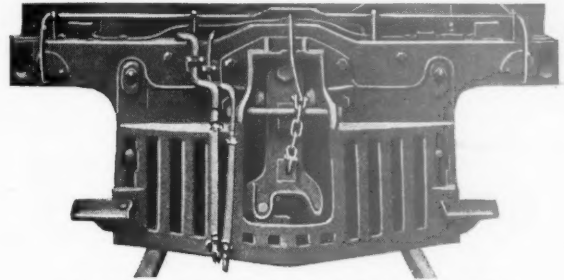


ONE-PIECE CAST STEEL LOCOMOTIVE BED WITH INTEGRAL CYLINDERS AND REAR CYLINDER HEADS, AND AIR RESERVOIR

**L**OCOMOTIVES  
EQUIPPED WITH  
COMMONWEALTH  
PRODUCTS GIVE  
GREATER SERVICE  
WITH LOWER  
MAINTENANCE  
COSTS.

**GENERAL STEEL  
CASTINGS CORPORATION**  
Eddystone, Pa. ~ Granite City, Ill.

• COMMONWEALTH PRODUCTS •



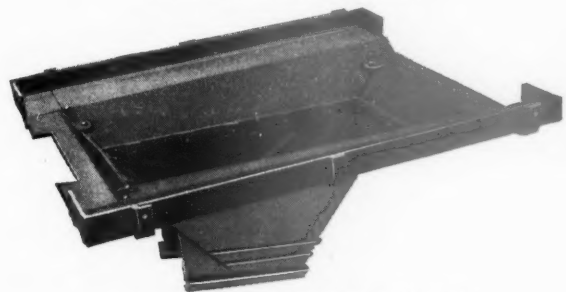
CAST STEEL PILOT WITH DROP COUPLER DEVICE



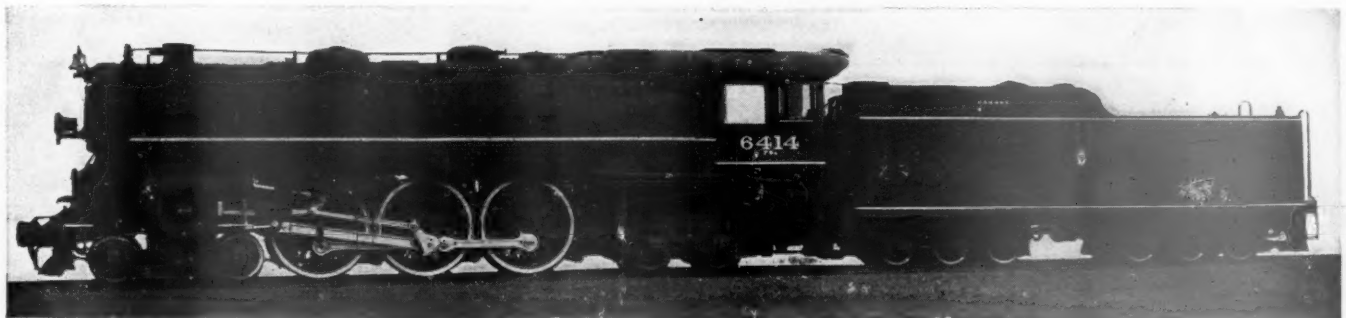
FOUR-WHEEL DELTA TYPE TRAILER TRUCK



FOUR-WHEEL ENGINE TRUCK



CAST STEEL SINGLE HOPPER ASH PAN



LOCOMOTIVE EQUIPPED WITH COMMONWEALTH CAST STEEL PRODUCTS



**Freight and Passenger Cars**  
OF ALL TYPES  
INCLUDING  
TANK AND REFRIGERATOR CARS

---

**Repairing and Rebuilding Cars**

We maintain complete facilities in the Pittsburgh and Chicago districts for handling repairs in large or small lots at the lowest possible cost.

Let us make an estimate on your repair work.

---

**Repair Parts**

PRESSED AND FABRICATED PLATES AND SHAPES  
CAST STEEL TRUCK SIDE FRAMES AND BOLSTERS  
STEEL, MALLEABLE AND GREY IRON CASTINGS  
CHILLED TREAD WHEELS  
FORGINGS—DROP FORGED WEDGES

---

**PRESSED STEEL CAR CO.**

NEW YORK PITTSBURGH CHICAGO ST. LOUIS ST. PAUL

# Improved Engineering

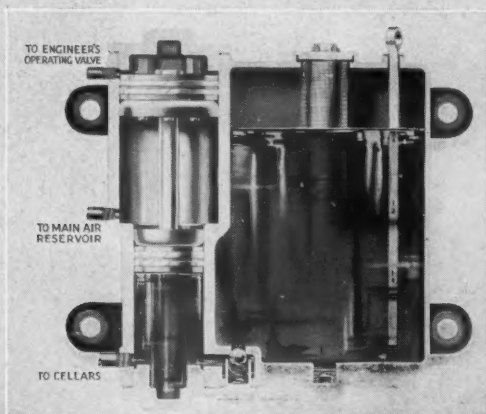
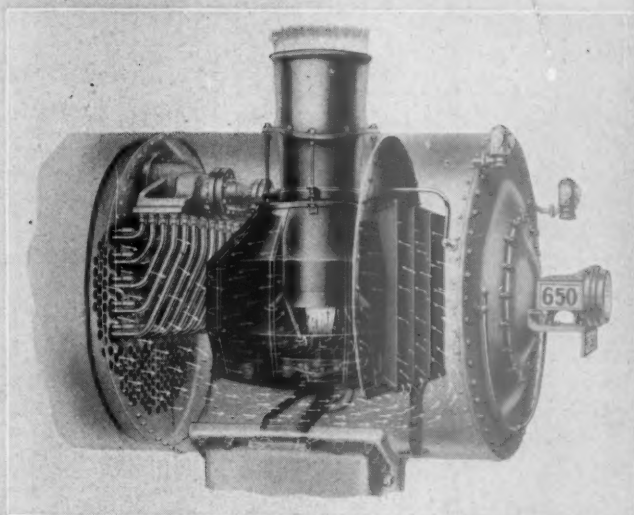


## Nicholson Thermic **SYPHONS**

By adding effective heating surface and creating rapid circulation, Syphons increase locomotive boiler efficiency 8.47%. They improve locomotive performance, reduce maintenance costs and provide unfailing safety. Syphons are recognized standard for old and new passenger, freight and switching locomotives.

## **CYCLONE** Spark Arresters

The cyclonic movement of the gases and cinders breaks up and quenches the sparks without use of netting and with no restriction of draft. Permits use of semi-bituminous or lignite coal without sparks. The Cyclone Spark Arrester is invaluable in territories where fire hazards are extreme. Now in service on more than 400 locomotives.



## **CHRISTY** Pneumatic Lubricators

Provides a manually operated pneumatic system supplying oil under pressure to engine and trailer truck cellars, preventing delays due to hot boxes and insuring continuous lubrication with minimum attention.

**LOCOMOTIVE FIREBOX COMPANY**

NEW YORK

CHICAGO

MONTREAL



# A Message to Steam Users from Dearborn Leaders In The Gay Nineties —Still Leaders Today

The fact that the Dearborn Chemical Company has long recognized the necessity for scientific water treatment was brought out in a ringing message to steam users written in 1897 by Wm. H. Edgar, founder:

"The Dearborn is the only concern that has ever brought a thoroughly equipped laboratory into service for the steam user."

True then, true now — the Dearborn Chemical Company, pioneers in scientific feed water treatment, places a thoroughly equipped laboratory at the service of the steam user. Dearborn Laboratories have been enlarged many times since Mr. Edgar wrote his message.

## Basic Principles of Scientific Procedure Reliable for 47 Years

Causes must be determined before troubles can be remedied. This basic fact is obvious and constitutes the reason for the existence of the great Dearborn Laboratories — to find through analysis and investigation the causes for undesirable conditions arising in locomotive boilers, and to determine the best combinations of treating materials for their correction or elimination. Dearborn chemists and engineers have specialized for 47 years in this work, and the great majority of railroads recognize the soundness of Dearborn methods and the excellence of Dearborn results.

We are not, and logically could not be, advocates of any one material or one combination of materials to treat all conditions. Such a position would be untenable when the chemistry of water is known, and the conditions that arise where high temperatures and pressures prevail are understood. Dearborn formulae are developed from a wide range of treating materials, as conditions demand.

This company has seen dozens of single-formula compounds come and go. These compounds have **claimed to do** all that Dearborn **has actually done**. The manufacturers have had no investment in qualified chemists, in laboratories, or in substantial production facilities. They could sell at very low prices. While the "cure-all" compound will no doubt continue to appear, under new guises, and to prove equally ineffective when tested, the wise steam user does not subject his power to the hazard of such tests.

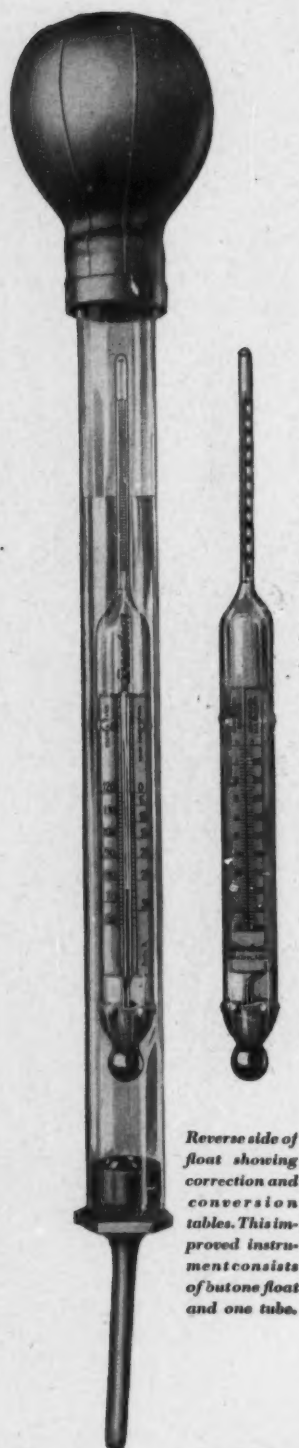
If you are not now using Dearborn Service — we invite your investigation and patronage.

## The New Improved Dearborn Concentration Hydrometer

A precision instrument. All readings are taken from the float in a single tube. Higher concentrations of salts may be safely carried when Dearborn Treatment is used, thereby saving heat lost in unnecessary blowing down. Testing of boiler water samples to determine blow down requirements becomes such a simple matter that readings can be taken in the cab of a moving locomotive.

### DEARBORN CHEMICAL COMPANY

310 S. Michigan Avenue, CHICAGO 205 E. 42nd Street, NEW YORK  
Canadian Office and Factory: TORONTO



Reverse side of float showing correction and conversion tables. This improved instrument consists of but one float and one tube.

The New Improved Dearborn  
Concentration Hydrometer

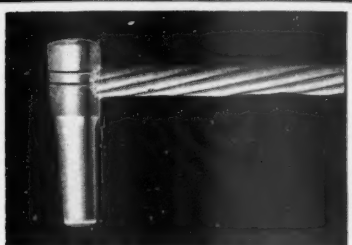
# TIGER-WELD PLUG TYPE SIGNAL BONDS

THE signal equipment of The Chicago, Milwaukee and St. Paul Railway—like most leading carriers—depends for its efficiency on Tiger-Weld Plug Type Signal Bonds.

Available either in Single or Duplex Type—both bonds offer flexibility and long life—withstand severe mechanical abuse and have a low resistance that adds greatly to the safety of the track circuit.

You are invited to write for interesting literature.

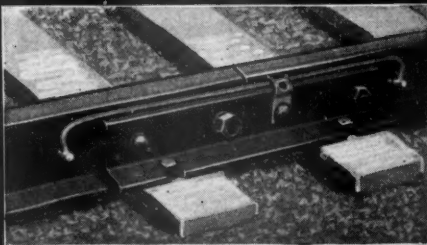
## ON GUARD



**TYPE S-1**

Composed of six extra galvanized steel wires surrounding one copper wire — butt welded to terminal.

The photograph reproduced on this page shows a crossing along the right-of-way of the Chicago, Milwaukee and St. Paul Railway.



**TYPE DS-1**

Has two conductors each having six extra galvanized steel wires surrounding one annealed copper wire.

1831

MORE THAN  
100 YEARS  
OF PROGRESS  
IN  
WIRE MAKING

1932

### AMERICAN STEEL & WIRE COMPANY

208 South LaSalle Street, Chicago

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

And All Principal Cities

Pacific Coast Distributors: Columbia Steel Company, Ross Building, San Francisco

Export Distributors: United States Steel Products Company, New York

# THE BETTENDORF COMPANY

OFFICES AND WORKS

BETTENDORF, IOWA

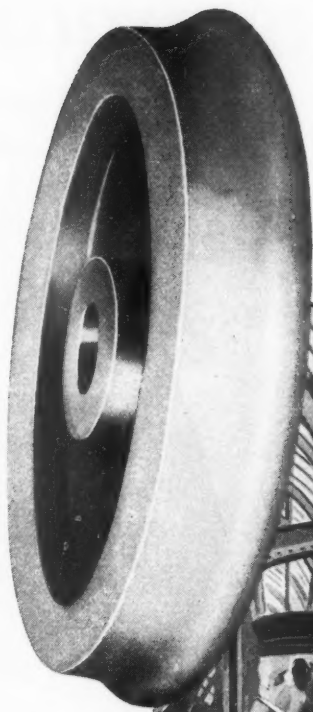
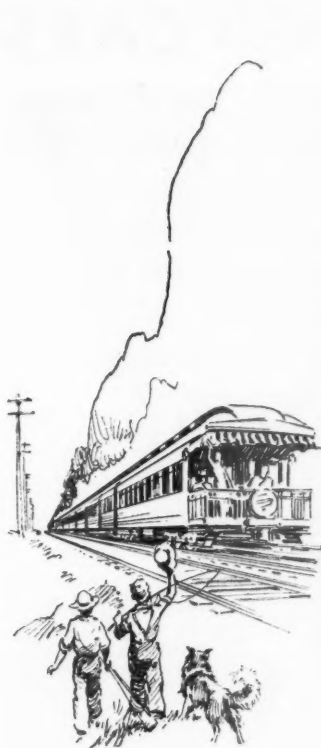
AN EFFICIENT ENGINEERING  
ORGANIZATION AND AN  
ADEQUATE PLANT, HAVING  
HIGHLY SPECIALIZED TOOLS  
AND EQUIPMENT, ENABLES  
THE BETTENDORF COMPANY  
TO PRODUCE

STEEL AND COMPOSITE  
FREIGHT TRAIN CARS  
STEEL UNDERFRAMES  
CAST STEEL TRUCK  
SIDE FRAMES  
CAST STEEL BOLSTERS  
SWING MOTION CABOOSE  
CAR TRUCKS

OF A QUALITY  
THAT SETS A STANDARD OF DE-  
SIGN AND WORKMANSHIP:

**truly quality products to which we  
eagerly apply the BETTENDORF  
trade marks**





**KEEP YOUR LOADS MOVING  
SAFELY — ECONOMICALLY**



**Illinois Steel Company**  
Subsidiary of United States Steel Corporation  
208 South La Salle Street, Chicago, Ill.



**PEOPLE** Of all the services rendered by the railroads, none is more exacting than the movement of people. Getting passengers where they are going quickly, safely, economically is the obligation which more than anything else has developed the machinery of railroading toward perfection.

**GARY WHEELS**  
WROUGHT STEEL

# ... and now for AIR-CONDITIONED CARS

## FAIRBANKS-MORSE

### Electrical Equipment Leads

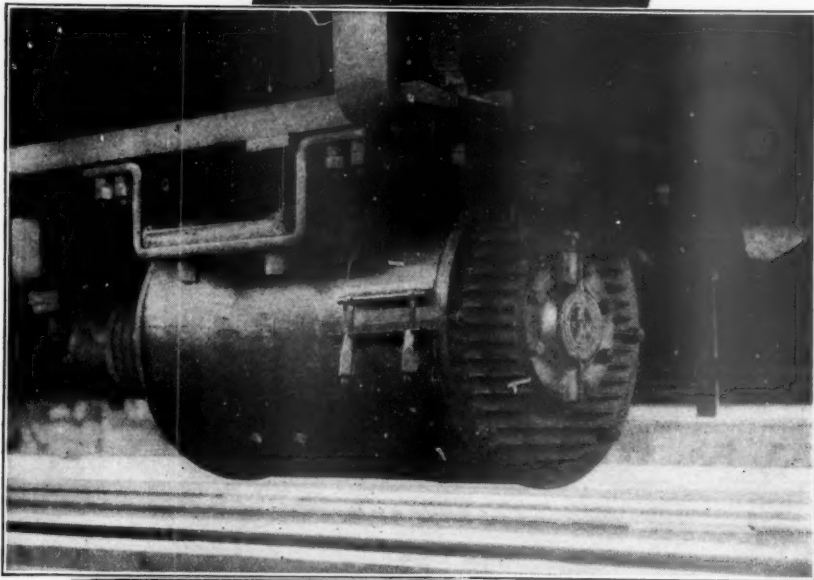
Gone are the dust, the heat of travel. The last annoyance has been banished. With air-conditioned coaches, railroad-ing definitely has established that "travel by rail is best."

● A majority of the air-conditioned cars now in successful operation carry the newly-developed Fairbanks-Morse third brush generators and special low voltage motors, furnishing electric power and drive for compressors, water pumps, cooling tower and air-conditioned unit fans.

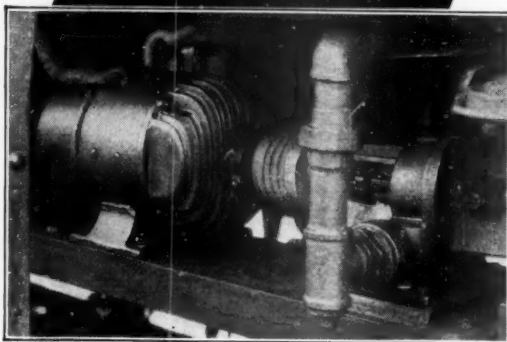
Forward-looking railroads are rightfully proud of the engineering and business achievement represented by air conditioned trains. Fairbanks, Morse & Co. takes equal pride in its pioneering contribution of highly specialized electrical equipment to this important development.

The specially-developed generator is of the third brush type, similar in principle to those successfully used on millions of automobiles for a period of many years, a larger number of which have been built than any other type of generator.

Special motors have been built to meet the unusual operating conditions imposed by the location of the equipment, speed control required and operating voltages. All have the same inherent features of construction that have resulted in the world-wide reputation of Fairbanks-Morse electrical equipment for reliability and long life.



The generator which is driven from the car axle is rigidly suspended from the frame of the car.



Small totally-enclosed D-C motor driving a pump which circulates water to cool the condenser coils. This unit is mounted in the open under a vestibule.



A specially designed semi-enclosed D-C motor mounted in a steel cabinet is used to drive the compressor.

## Fairbanks, Morse & Co.

Railroad Sales Offices

Baltimore  
New York  
Chicago

St. Louis  
St. Paul  
San Francisco



5775-RA21.85

# Merely Keeping Busy Is Not Good Business



THE reclamation of springs in railroad shops may keep a few men busy but it costs much more than sending broken springs to us for repair. This keeping busy is often bad business.

Few railroads have sufficient volume in tonnage to justify the purchase of the equipment needed to rework and heat treat old springs and make them equal to new. Few shops can keep workmen so busy on springs that they become really expert. Only a big spring organization can perform research work and advance with the art of spring making.

The repair of broken springs should receive the same skillful attention as the manufacture of new ones. Much of the misalignment of locomotive equalizing mechanisms is due to poor and non-uniform springs. Without adequate equipment, skilled labor, a volume in tonnage and a complete, well-rounded organization it is impossible to repair springs properly and economically.

*Send Your Springs To Us For Repairs*



## Railway Steel-Spring Company

30 CHURCH ST., NEW YORK

Branch Offices:

Chicago, Ill.

St. Paul, Minn.

Washington, D. C.

St. Louis, Mo.

Cleveland, Ohio

Denver, Colo.

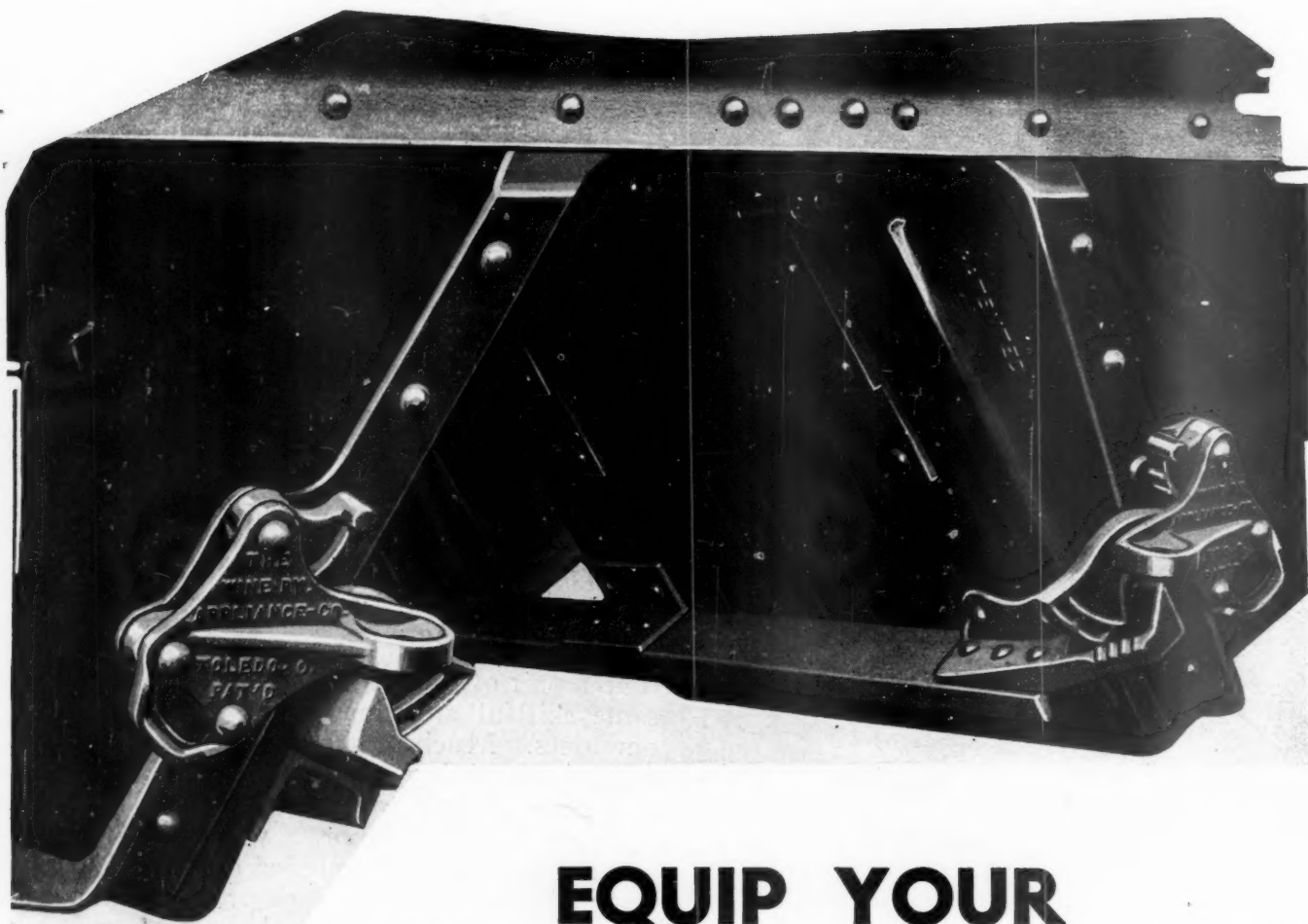
Pittsburgh, Pa.

San Francisco, Cal.

Montreal, Que.



# SEALED DOORS ARE LEAK PROOF.



**EQUIP YOUR  
CARS WITH THIS DEVICE AND  
ELIMINATE COAL LOSS CLAIMS.**



The Wine Railway Appliance Co.  
TOLEDO, OHIO

Peoples Gas Bldg.  
Chicago

Munsey Bldg.  
Washington, D. C.

## **WINE DOOR LOCKS**

*"The Simplest of All Door Mechanisms"*

**GRIFFIN 8501b. SINGLE PLATE CHILLED TREAD WHEELS** HAVE REPEATEDLY PROVEN THEIR **DEPENDABILITY** AND **ECONOMY** UNDER **70 TON CARS.**



THE FOOD SUPPLY OF THE NATION IS CARRIED ON CHILLED TREAD WHEELS

**GRIFFIN WHEEL COMPANY**

410 NORTH MICHIGAN AVENUE

CHICAGO, ILLINOIS

Plants

Chicago  
Pullman

Boston  
Detroit

Cleveland  
Cincinnati

Kansas City  
St. Paul  
Council Bluffs

Denver  
Salt Lake City

Los Angeles  
Tacoma

For SERVICE AND DELIVERY

# MAGNUS METAL

---

WHERE RECORDS ARE MADE YOU  
WILL FIND MAGNUS PRODUCTS

"MAGNUS PRODUCTS ARE BRASS INSURANCE"

---

**MAGNUS COMPANY**  
*INCORPORATED*

NEW YORK

CHICAGO





THANK YOU,  
LITERARY DIGEST—

Both railroad men and the general public are certainly interested in the spectacular accomplishments of Timken Bearings not only in locomotives but in all types of railway rolling stock.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

**TIMKEN** *Tapered  
Roller* **BEARINGS**

# Complete Continuous Dependable Air Conditioning

Helping your cars produce more revenue

**R**EALIZING the importance of air conditioning for cars, railroad officials are giving serious thought to the selection of the most complete, dependable, safe and economical type of equipment.

The CARRIER-SAFETY steam ejector system of air conditioning for passenger cars has been designed and built to give the complete result required with dependability, safety, and reasonable cost for installation and operation.

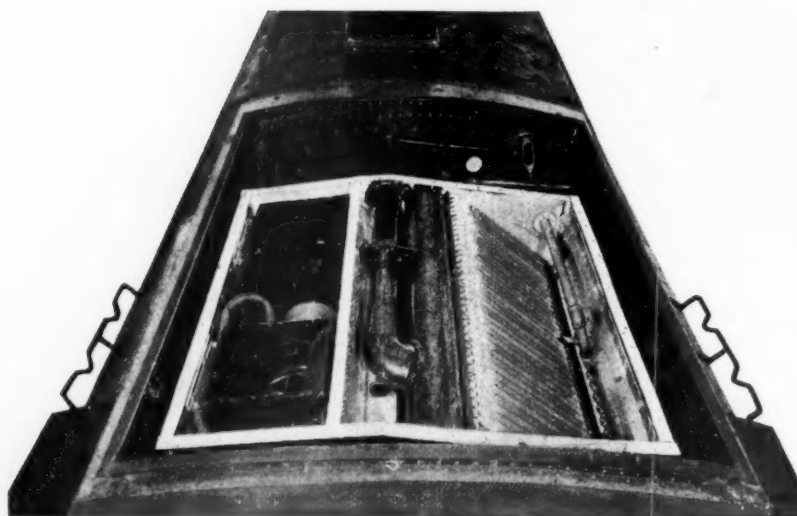
It is complete in that it provides clean air at the temperature, humidity and velocity of movement best suited for the health and comfort of the occupants of the car.

It is dependable because of its simplicity, having relatively few moving parts and because the major portion of the power for its operation is obtained directly from the locomotive boiler.

It is safe because water is used as the refrigerant.

It is economical because its simplicity will insure continued operation without involving large maintenance expense.

You should investigate this system thoroughly before making your decision.



The Carrier-Safety Steam Ejector Refrigerator Condenser Unit. Note the complete absence of moving parts. This replaces the compressor, condenser, cooling tower and evaporator, used with all other mechanical units. Being completely static nothing can wear out.



## THE SAFETY CAR HEATING & LIGHTING CO.

NEW YORK  
75 WEST ST.

CHICAGO  
310 SO. MICHIGAN AVE.

ST. LOUIS  
705 OLIVE ST.

BOSTON  
80 BOYLSTON ST.

PHILADELPHIA  
1617 PENNSYLVANIA BLVD.

SAN FRANCISCO  
582 MARKET ST.

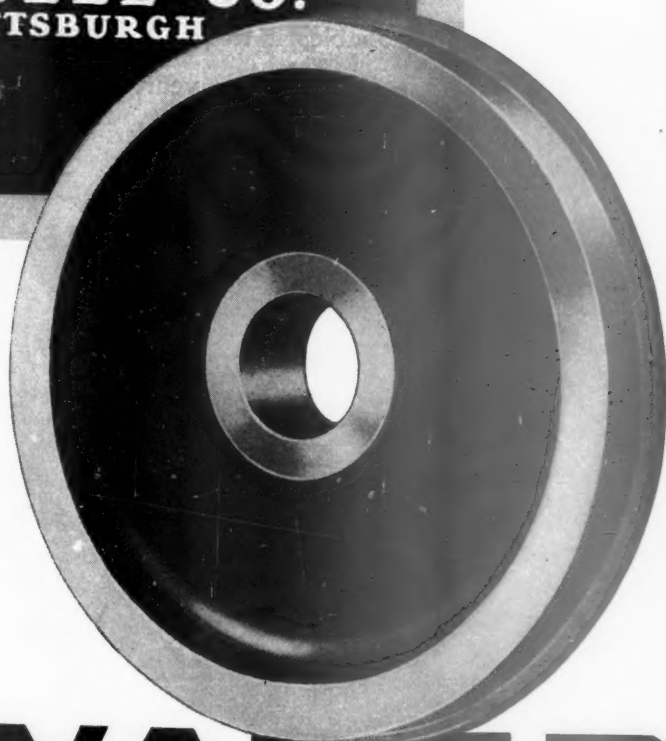
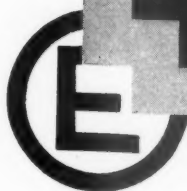
MONTREAL  
620 CATHCART ST.



# ROLLED STEEL WHEELS

LOCOMOTIVE  
& CAR WHEEL  
TIRES

EDGEWATER  
STEEL CO.  
PITTSBURGH



*Sales Offices:*

Atlanta, Ga.	Portland, Ore.
Baltimore, Md.	San Francisco, Cal.
Boston, Mass.	St. Louis, Mo.
Chicago, Ill.	Seattle, Wash.
Louisville, Ky.	St. Paul, Minn.
Philadelphia, Pa.	Washington, D. C.
New York, N. Y.	

# EDGEWATER



# OXWELDING-

*as dependable*  
*as Railroad Service itself*

The dependability of oxwelding and cutting in railroad maintenance is as axiomatic as the dependability of railway service itself. That this is so has not been a matter of chance, but rather the result of closest co-operation between the railroads and an organization that *specializes* in adapting the oxy-acetylene process to railroads' needs. • This organization is The Oxweld Railroad Service Company, whose twenty years' experience in applying oxy-acetylene welding and cutting to railroad maintenance enables it to bring utmost efficiency and economy to every phase of the work. Each year, the majority of Class I railroads find that Oxweld Railroad Service is increasingly valuable.



*The Oxweld Railroad Service Company*

*Unit of Union Carbide and Carbon Corporation*

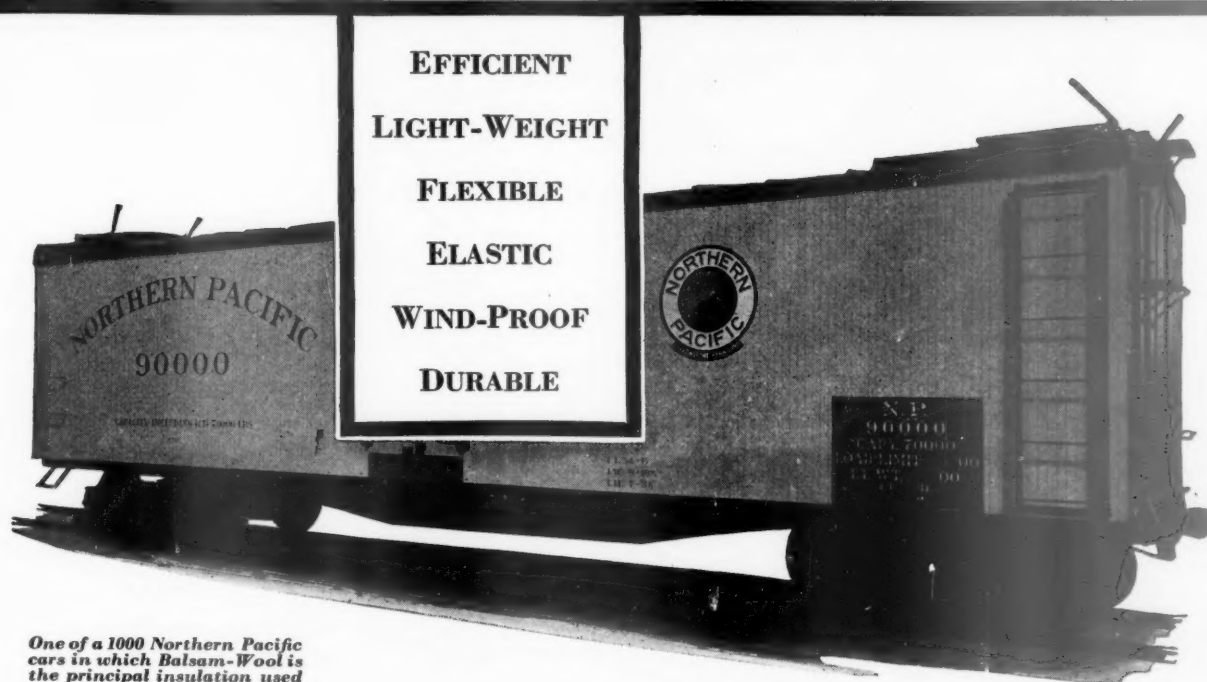


NEW YORK, Carbide and Carbon Building

CHICAGO, Carbide and Carbon Building

# Balsam-Wool

## Refrigerator Car Insulation



One of a 1000 Northern Pacific cars in which Balsam-Wool is the principal insulation used

Shippers are demanding better refrigerator cars—cars that will hold lower temperatures. New and rebuilt cars lined with Balsam-Wool—*light weight* and *durable*—assure the insulating efficiency now demanded. And—car weight is kept at a minimum.



### WOOD CONVERSION COMPANY

Mills at Cloquet, Minnesota

Railroad Sales Offices: CHICAGO—360 No. Michigan Ave.; NEW YORK—3107 Chanin Bldg.;  
DETROIT—320 Stephenson Bldg.

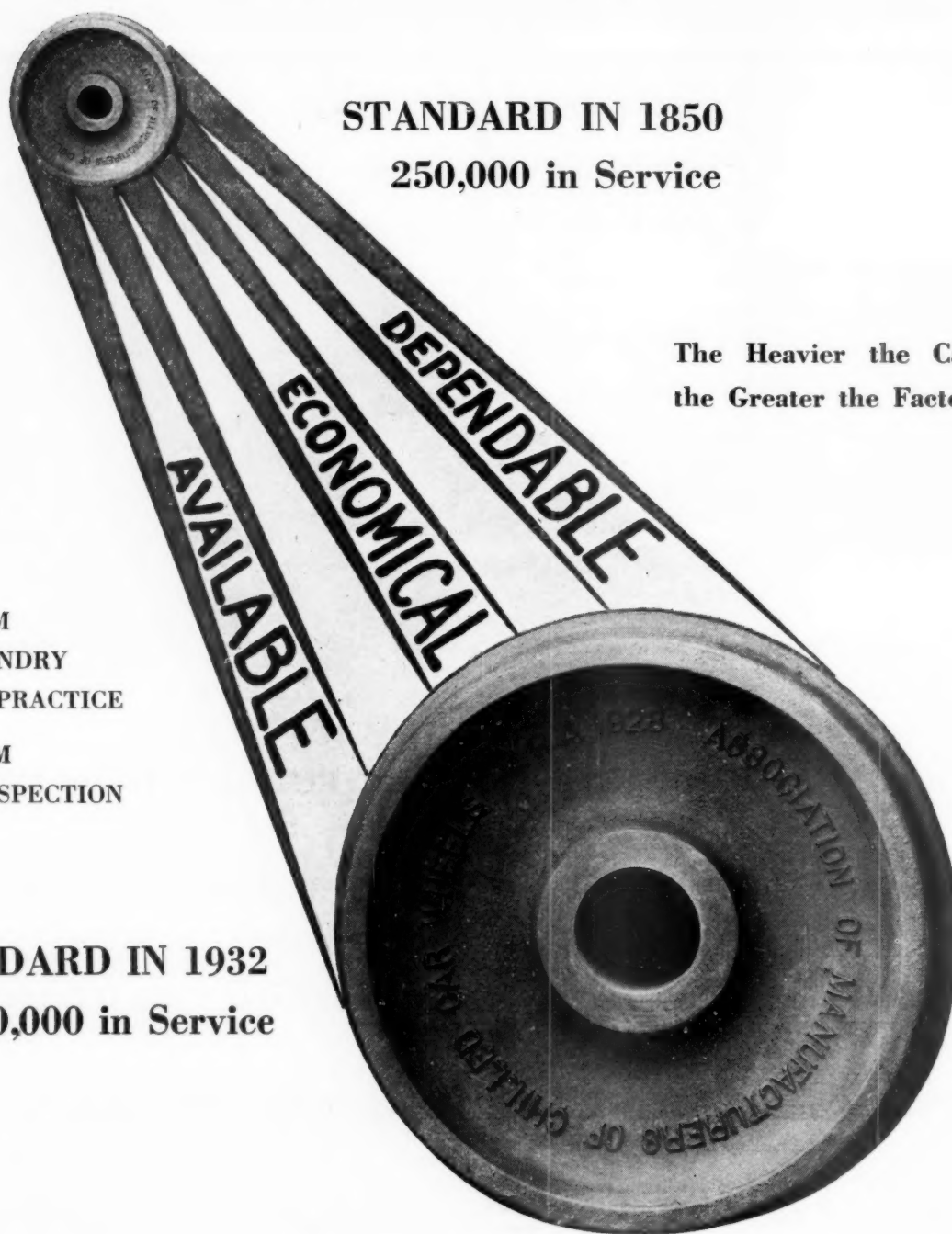
# THE WONDERFUL SINGLE SERVICE CHILLED TREAD WHEEL

STANDARD IN 1850  
250,000 in Service

The Heavier the Car Capacity  
the Greater the Factor of Safety

UNIFORM  
FOUNDRY  
PRACTICE  
UNIFORM  
INSPECTION

STANDARD IN 1932  
25,000,000 in Service



## SINGLE PLATE CHILLED TREAD WHEELS

A.R.A. STANDARDS

650-lb. for 30-ton cars—700-lb for 40-ton cars—750-lb. for 50-ton cars—850-lb for 70-ton cars

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS  
1847 McCORMICK BUILDING CHICAGO, ILL.



## UNION PACIFIC SYSTEM

UNION PACIFIC RAILROAD COMPANY  
OREGON SHORT LINE RAILROAD COMPANY  
OREGON WASHINGTON RAILROAD & NAVIGATION COMPANY  
LOS ANGELES & SALT LAKE RAILROAD COMPANY

THE ST. JOSEPH AND GRAND ISLAND RAILWAY COMPANY

E. C. SCHMIDT  
DIRECTOR OF NEWS SERVICE

April 1, 1932

1416 DODGE STREET  
OMAHA, NEBRASKA  
04-09

Caterpillar Tractor Co.,  
Peoria, Illinois.  
Gentlemen:

You may be interested to know that in 1927 the Union Pacific purchased one of your "Caterpillar" Sixty machines, which at that time was the largest machine which your company manufactured. This machine has had a most versatile and spectacular career and so far as our engineering department knows, no other "Caterpillar" Tractor has ever been put to the uses to which this particular machine was subjected.

It was used in the construction work incident to the building of the Union Pacific Grand Canyon Lodge on the brink of the North Rim of Grand Canyon at the edge of Kaibab National Forest. This construction work, at a point 200 miles from any railroad and 70 miles from the nearest human habitation, was carried on during an entire winter. Roads had to be broken through the Kaibab forest and these roads had to be kept open regardless during the winter in order that food and supplies might be taken in to the construction gang. Aside from Indians and trappers, human beings had never before spent a winter in that wilderness.

During the routine of the day this tractor was used for driving snowplows; for dragging logs through the Kaibab National Forest to the sawmill which was built at the construction site. It provided the power to run the mill itself and cut the logs into timber. It was used for pulling up large trees by the roots in order to clear the building sites. It became a power plant for the sand-making machine in which the rock of the canyon was ground into sand for concrete work. It hauled trucks over bad roads and pulled them out of mud holes and through bogs in the roads when they could no longer "navigate." It pulled road-scrappers to restore damaged roads, and hauled trains of trucks loaded with heavy rock used in the construction. It became a battle-scarred veteran but still is in the ring somewhere in the West.

Yours very sincerely,

*E. C. Schmidt*

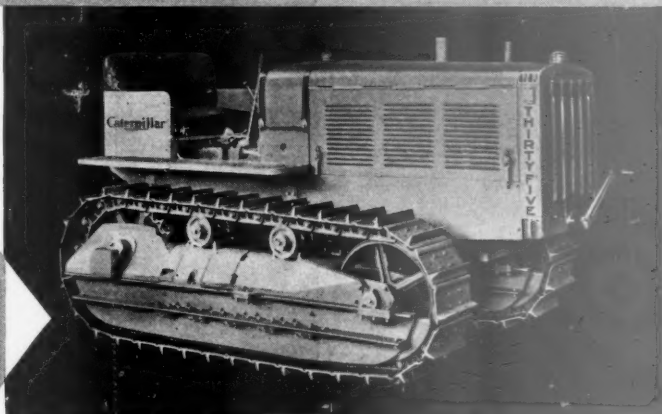
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.  
Track-type Tractors Combines Road Machinery  
(There's a "Caterpillar" Dealer Near You)

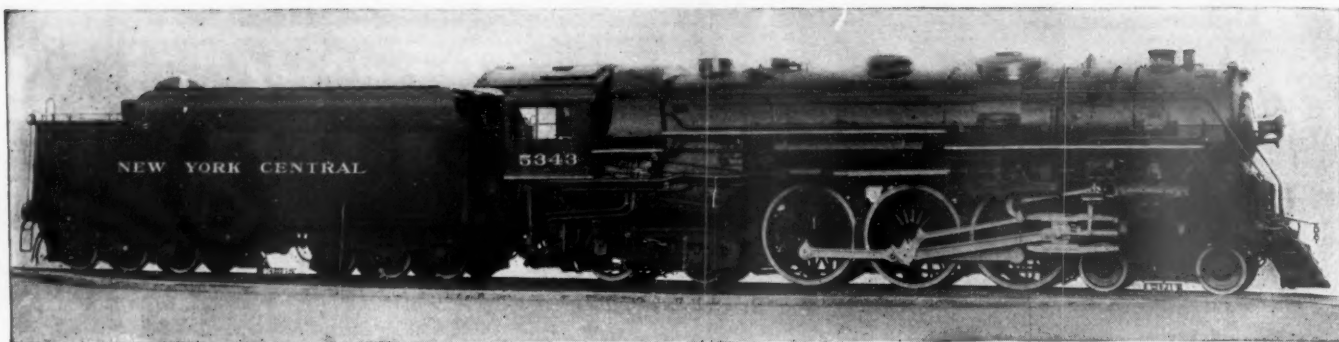
### Prices—f. o. b. Peoria, Illinois

FIFTEEN . . . \$1100	THIRTY-FIVE \$2400
TWENTY . . . \$1450	FIFTY . . . \$3675
TWENTY-FIVE \$1900	SIXTY-FIVE . \$4350
DIESEL . . . \$6500	

# CATERPILLAR

REG. U. S. PAT. OFF.





## OVER 100,000 MILES... OF FAST PASSENGER SERVICE\*

\* This is the first railroad-owned passenger locomotive to have all drivers equipped with anti-friction bearings.

Placed in regular fast passenger service in October, 1931, the J. I. Hudson Type Locomotive No. 5343 shown, of the New York Central Lines, equipped with large SKF two-row Self Aligning Journal Bearings on the engine truck, all drivers and tender, has been operating on schedule every day since then... without a bit of bearing trouble.

In fact, these bearings have required no maintenance except that of periodical lubrication plus inspection only at general shopping. Naturally, maintenance costs have been reduced to a negligible quantity. More than this, there have

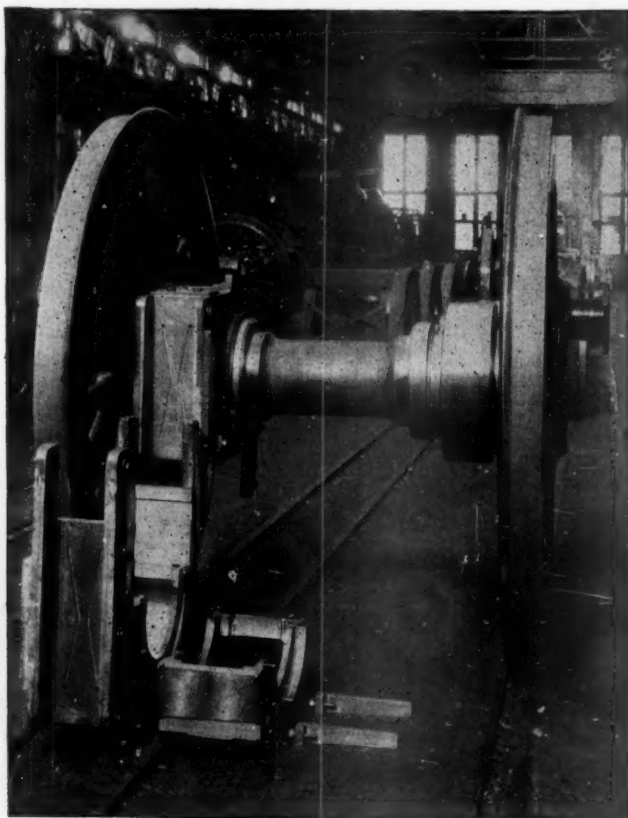
been no hot boxes...and no expensive detentions.

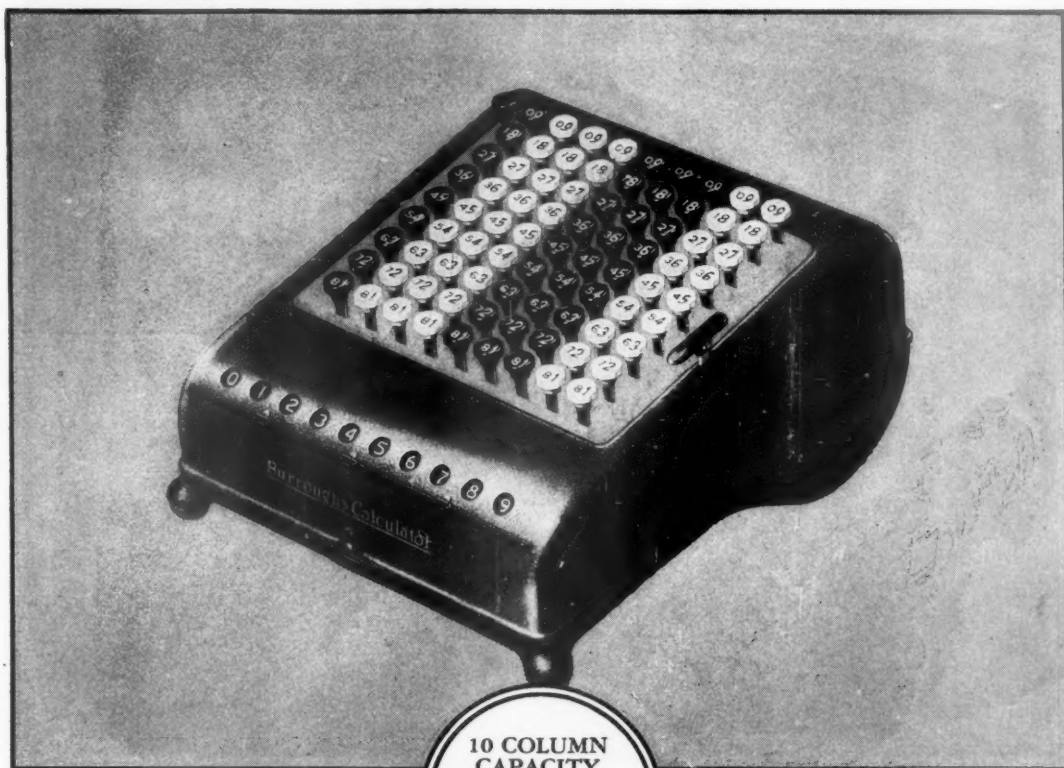
Factors like these loom large where the highest standard of railroad operation is desired combined with the lowest possible cost without sacrifice of reliability. They are logical and dividend paying reasons why it would be well to consider modernizing your new locomotives

throughout with SKF Bearings, thereby raising your bearing dependability to the highest possible degree, and at the same time reducing upkeep to new low levels. Modernize to economize NOW! SKF Industries, Inc., 40 East 34th Street, New York, N. Y.

# SKF

## JOURNAL BEARINGS





10 COLUMN  
CAPACITY  
LIST PRICE  
**\$300**  
DELIVERED  
U. S. A.

# Burroughs

## ELECTRIC CALCULATOR CUTS ACCOUNTING COSTS

Railroad companies, everywhere, find that the Burroughs Electric Calculator reduces accounting expenses because its speed and ease of operation mean more production per operator. ✓ ✓ It is fast, as a light key touch actuates the motor—and the motor instantly completes the operation. It is accurate, as each key has a short, light, uniform stroke that always registers the key's full value on the dials. ✓ ✓ Call the local Burroughs office for a demonstration on your own work.

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BURROUGHS ADDING MACHINE COMPANY ✓ ✓ DETROIT, MICHIGAN

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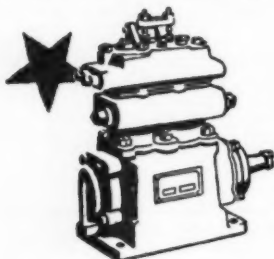




**SAFETY**

★ **GEARED**  
*to the*  
**TIMES**

Yesterday's brakes have no rating in the modern scheme of heavy-duty transportation. In their place stands a time-tested principle of control—Bendix-Westinghouse Automotive Air Brakes ★ Matchless is the word which best describes the traditional security of this braking system. And now, due to its almost universal acceptance as standard equipment, no one interested in the safe, swift movement of motor carriers need be satisfied with anything short of Air Brake performance ★ Bendix-Westinghouse Automotive Air Brake Company at Pittsburgh, Penna.



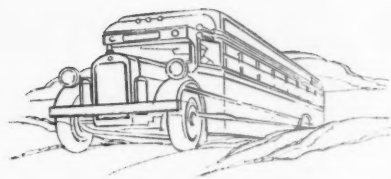
**THE COMPRESSOR**  
The heart of the Air Brake, this particular unit represents an achievement of more than a half century's effort in the development and manufacture of devices which must not fail. A positive source of abundant power for brake control, it also supplies a dependable force for every pneumatic requirement of the modern motor transport.

**BENDIX  
WESTINGHOUSE**  
*Automotive Air Brakes*



*"Do you really need \$second gear on that grade?"*

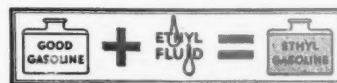
**Stay in a higher gear with ETHYL**



**L**OW GEARS were put into your buses for a purpose. But that purpose wasn't to run engines into the shop before their time. Ethyl Gasoline keeps buses out of the shop—cuts maintenance costs by **CUTTING DOWN ENGINE REVOLUTIONS PER TRIP.**

The Ethyl fluid in Ethyl Gasoline prevents knocking—stops the power waste and overheating that make drivers drop to a lower gear on hills that should be made in high. It draws more power from each drop of gasoline—helps your buses on hills and in getaway. In cities this faster acceleration often means another block before the traffic light turns red . . . saves time, and in some instances permits the use of fewer buses to handle definite routes.

Ethyl Gasoline *does* cost more per gallon—but bus operators have proved under various types of operating conditions that it *costs less per bus mile*. You can duplicate the successful experiences of other bus owners. Give Ethyl Gasoline a trial! Ethyl Gasoline Corporation, New York City.



Ethyl fluid contains lead © E. G. C. 1932

### **BETTER THAN EVER**

The anti-knock standard of Ethyl Gasoline has now been raised still higher. You get even more for your gasoline dollar. Now test Ethyl!

*Cut down engine revolutions per trip—*

**Use ETHYL GASOLINE**

# The Outstanding Values in Trucks Today



*This International Model A-6, 170-inch wheelbase, with a special body, winch, and low-pressure pump, is operated by the Pennsylvania Railroad.*

**W**HEN you are in the market for motor trucks be sure to investigate the complete modern line of International Trucks. There is a capacity and wheelbase for every type of hauling, at attractive prices that make Internationals the outstanding truck investment today. The list of speed and heavy-duty models at the right shows the wide range from which you can select those best suited for your work.

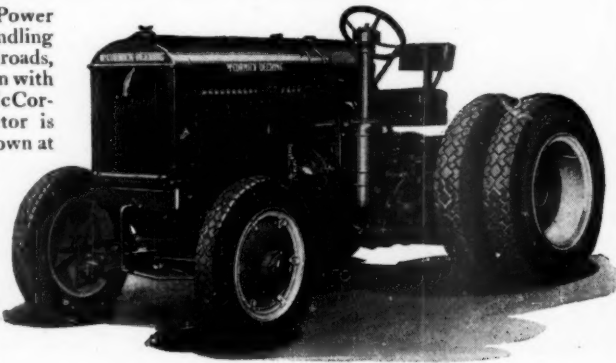
International Trucks are soundly designed and engineered for long truck life and efficient operation at low cost. They are built strong, in-

side and out, to stand up under the most difficult conditions. Alloy and heat-treated steels, and ball and roller bearings are used at many points to reduce wear and friction to a minimum. Powerful but economical engines provide abundant power and speed.

Service . . . so vital in truck operation . . . is available everywhere on International Trucks. There are 183 Company-owned branches in the United States and Canada that keep Internationals on the job. The nearest branch will be glad to demonstrate any model.

## MCCORMICK-DEERING INDUSTRIAL POWER

McCormick-Deering Industrial Power is cutting costs on material handling and a variety of other jobs for railroads, working alone or in combination with many types of equipment. The McCormick-Deering Industrial Tractor is built in two sizes—Model 30, shown at the right, has a 40 h. p. engine; Model 20 is similar in design and has a 25 h. p. engine. There are also two McCormick-Deering Power Units for stationary power work—Model 300 developing 40 h. p., and Model 200 developing 25 h. p. Model T-20 TracTracTor is available where crawlers are needed for traction.



## INTERNATIONAL HARVESTER COMPANY

606 So. Michigan Ave.

OF AMERICA  
(Incorporated)

Chicago, Illinois

## INTERNATIONAL HARVESTER

**Offers a Capacity  
and Wheelbase  
for Every Hauling  
Requirement**

### ¾-ton Speed Truck

Model A-1. 4-cylinder engine, 3 $\frac{3}{8}$ " bore x 4 $\frac{1}{2}$ " stroke. 4 speeds forward, 1 reverse. Wheelbase, 136". Spiral-bevel drive.

### "Six-Speed Special"

Model B-2. 1½-ton. 4-cylinder engine, 3 $\frac{3}{8}$ " bore x 4 $\frac{1}{2}$ " stroke. 6 speeds forward, 2 reverse. Wheelbase, 136". Spiral-bevel drive (with 2 speeds).

### 1½-ton Speed Trucks

Model A-2—4-cylinder engine, 3 $\frac{3}{8}$ " bore x 4 $\frac{1}{2}$ " stroke.

Model A-3—6-cylinder engine, 3 $\frac{1}{4}$ " bore x 4 $\frac{1}{2}$ " stroke.

Wheelbases for both, 136" and 160".

Model AL-3—6-cylinder engine, 3 $\frac{1}{4}$ " bore x 4 $\frac{1}{2}$ " stroke.

Wheelbases, 138", 152", and 164".

All have 4 speeds forward, 1 reverse, and spiral-bevel drive.

### 2-ton Speed Truck

Model A-4. 6-cylinder engine, 3 $\frac{3}{8}$ " bore x 4 $\frac{1}{2}$ " stroke. 5 speeds forward, 1 reverse. Wheelbases, 145", 156", 170", and 185". Spiral-bevel drive.

### 3-ton Speed Trucks

Model A-5 (spiral-bevel drive) and Model A-6 (double-reduction drive). 6-cylinder engines, 3 $\frac{3}{8}$ " bore x 4 $\frac{1}{2}$ " stroke. 5 speeds forward, 1 reverse. Wheelbases, 140", 156", 170", 190", and 210".

### 2½ to 3-ton Heavy-Duty Truck

Model W-1. 4-cylinder engine, 4 $\frac{1}{4}$ " bore x 5 $\frac{1}{2}$ " stroke. 5 speeds forward, 2 reverse. Wheelbases, 130", 148", 170", 185", and 200". Double-reduction drive.

### 3½-ton Heavy-Duty Truck

Model W-2. 4-cylinder engine, 4 $\frac{1}{2}$ " bore x 5 $\frac{1}{2}$ " stroke. 5 speeds forward, 2 reverse. Wheelbases, 130", 148", 170", 185", and 200". Double-reduction drive.

### 3½ to 5-ton Heavy-Duty Truck

Model W-3. 4-cylinder engine, 4 $\frac{3}{4}$ " bore x 5 $\frac{1}{2}$ " stroke. 5 speeds forward, 2 reverse. Wheelbases, 144", 160", 185", 210", and 235". Double-reduction drive.

### 5-ton Heavy-Duty Trucks

Model A-7—6-cylinder engine, 4 $\frac{1}{2}$ " bore x 5 $\frac{1}{2}$ " stroke.

Model A-8—6-cylinder engine, 5" bore x 5 $\frac{1}{2}$ " stroke.

Both have 5 speeds forward, 2 reverse, and double-reduction drives. Wheelbases, 160", 180", 200", and 225".

The 1½-ton, 4-speed Model A-2  
Now reduced to

**\$615**

for the 136-inch Wheelbase  
Chassis f. o. b. factory

# INTERNATIONAL TRUCKS



# What Tire is Best...?

## *Surface Transportation has the Facts*



One of the double-decker Surface Transportation buses used in city service . . . Mr. W. J. Cumming—General Superintendent

**Giant Bus System reduces damaged tire costs 98%  
Increases Tire Mileage 60% . . . Cuts Tire Delays 59% with  
Goodrich Balloons and Air Containers**

**T**HE Surface Transportation Corporation of New York carries over 40,000,000 passengers annually—operates 225 buses—travels 6,500,000 miles a year in the congested Bronx Borough and suburban Westchester.

A few years ago road conditions in the Bronx were causing frequent delays. Tire equipment simply couldn't stand the gaff. In 1928 this matter became so serious that Surface Transportation developed a powerful magnet machine to travel each route and remove harmful debris. It did no good. They couldn't work fast enough.

Then in the spring of 1930 Surface Transportation discovered Goodrich Bus Balloons!

"Our records show," says Mr. W. J. Cumming, General Superintendent, "that this change-over to Goodrich was one of the best investments we ever made. Goodrich Bus Balloons and Air Containers have en-

abled us to increase our tire mileage 60%, cut road delays due to tire failures 59%, and reduce damaged tire costs to one-fiftieth of what they formerly averaged!"

This record is not unique. Hundreds of operations have effected similar economies by changing to Goodrich. And now, with this new Goodrich Balloon, they'll cut their costs still further.

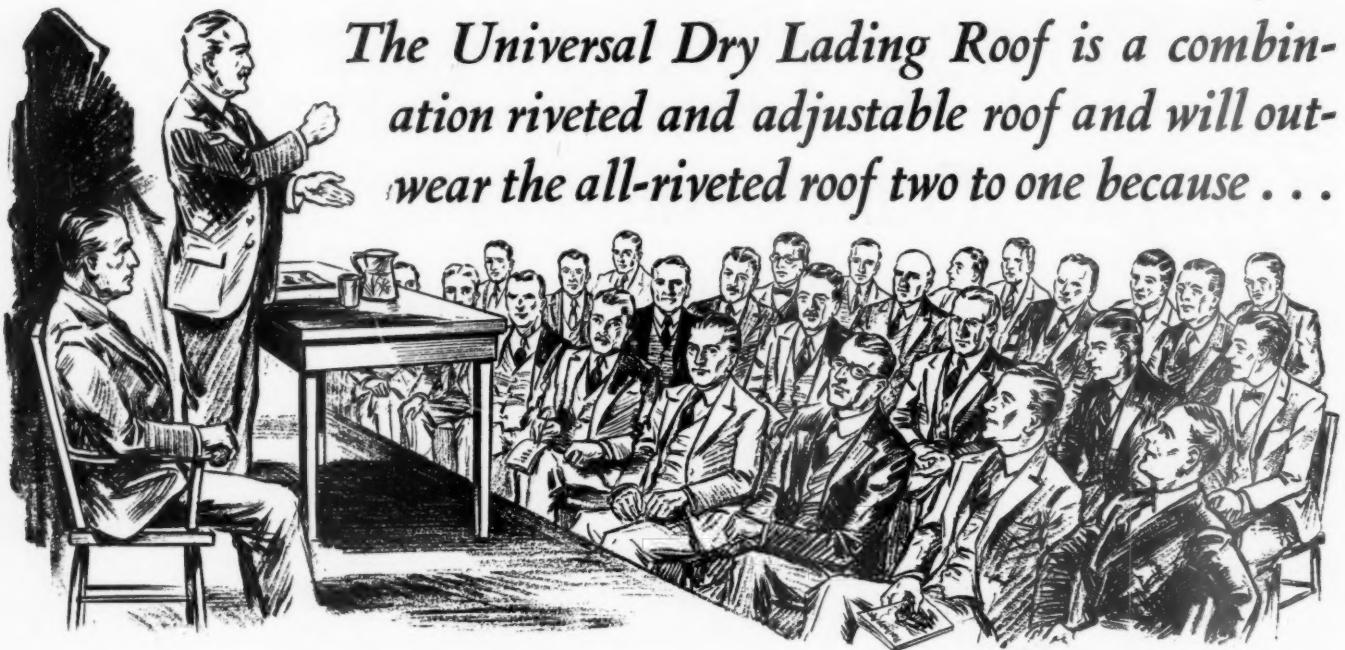
The B. F. Goodrich Rubber Co., Est. 1870, Akron, Ohio. Pacific Goodrich Rubber Co., Los Angeles, Cal. In Canada: Canadian Goodrich Co., Ltd., Kitchener, Ont. The International B. F. Goodrich Corp. (Export).



**27% GREATER BRAKING CONTROL.** Tests prove the new Goodrich Heavy Duty Express Balloon has as much as 27% greater resistance to skidding. Its tougher, 15% deeper, thicker tread will deliver thousands of additional, safe, trouble-free miles.

# Goodrich *Bus* Balloons

 SPECIFY GOODRICH ON YOUR NEW BUSES



*The Universal Dry Lading Roof is a combination riveted and adjustable roof and will outwear the all-riveted roof two to one because . . .*

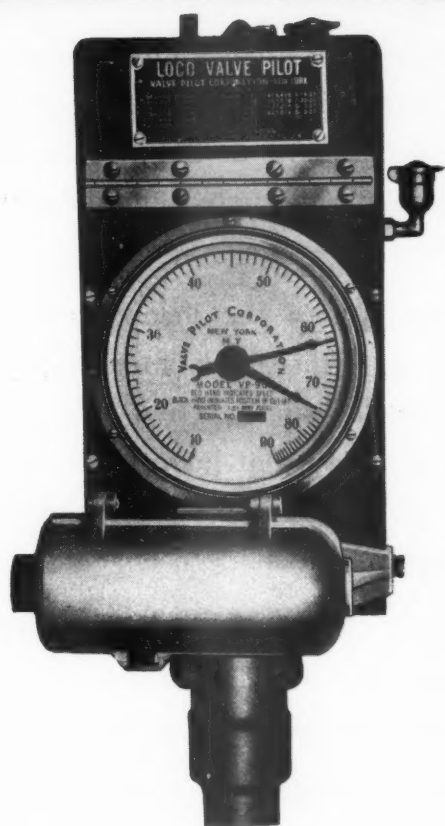
*its carlines, purlines, caps, saddles, and flashing are rigidly secured to the car and to one another—BUT THE ROOF SHEETS FLOAT*

THE floating sheets make the roof adjustable so that it will not buckle, bulge or deteriorate from strain. That's just where the Universal Roof is so far superior to the all-riveted roof.

And does this roof save money? Here are some facts from actual service records. The maintenance on Dry Lading Roofs was only \$4,519.49 for 18 years on 30,000 cars owned by the largest railroad in North America. Less than one cent per roof per year. This performance record, extending over as long a period as 18 years and on as many cars as 30,000 cars is well worthy of your careful study. Compare these figures to your own.

ANNUAL  
FUEL BILL  
Class 1 Railroads  
300,000,000  
DOLLARS

SAVE  
5% to 8%  
OF YOUR  
FUEL COSTS  
BY EQUIPPING  
LOCOMOTIVES  
with the  
LOCO VALVE PILOT



FUEL, next to labor, is the largest single railroad expenditure. That's the place to strike for the biggest improvement in the balance sheet. Figure out how much a 5 per cent to 8 per cent saving in fuel on your road will lower operating costs, and improve net income.

You can depend on that saving too. Bigger savings have been made in regular service on various types of locomotives.

A fuel saving of 8 per cent was the record of the LOCO VALVE PILOT on a Mikado locomotive.

On a heavy freight locomotive over level, hilly, and mountainous divisions, the LOCO VALVE PILOT effected average savings of 14 per cent.

VALVE PILOT CORPORATION

230 Park Avenue, New York City

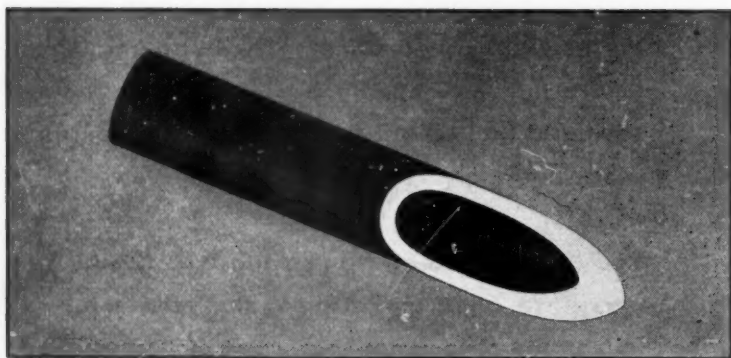


# Patch



# Repairs..

A patch repair—resulting in a serious internal restriction not apparent from the outside.



A remanufactured superheater unit  
—all original internal and external  
dimensions faithfully reproduced.

may forestall general overhauling . . . for a time, but there is always the liability of failure with a feeling of uncertainty. Repairs may be made so often that total costs mount above the cost of rebuilding in the first place . . . and such repairs do not give the assurance of uninterrupted and satisfactory service.

In no part of the locomotive equipment, does this apply more than with superheater units. Thousands are in service today that have outlived their serviceable life and continual fixing is costing too much.

These units can be rebuilt by the Elesco method and new life of uninterrupted, full-capacity service assured.

Elesco rebuilding or remanufacturing unserviceable units is correct workmanship that gives 100 per cent service.

## THE SUPERHEATER COMPANY

*Representative of American Throttle Co., Inc.*

60 East 42nd Street  
NEW YORK



A-706

Peoples Gas Building  
CHICAGO

Canada: The Superheater Company, Limited, Montreal

Superheaters

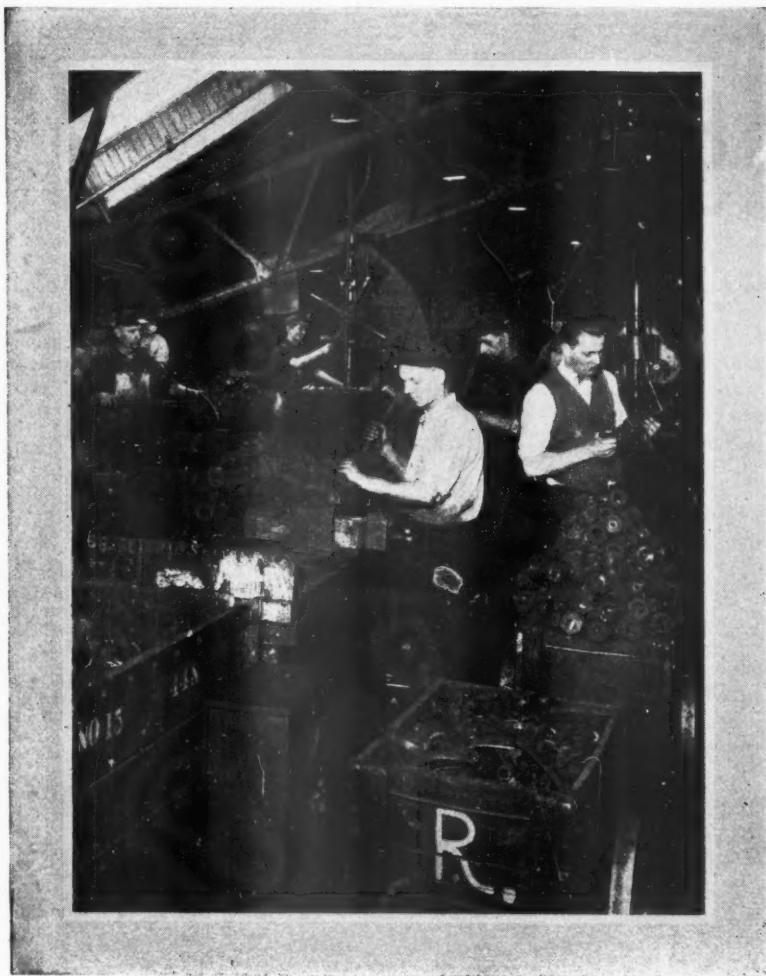
Feed Water Heaters

Exhaust Steam Injectors

Superheated Steam Pyrometers

American Multiple Throttles

**HAVE YOU TRIED IT?**



*let us  
repair  
your  
brake  
apparatus*

**W**E have unequalled facilities for reconditioning all airbrake devices and making them as good as new—specialists in repair work as in original manufacture . . . Our production facilities and means for reclaiming worn parts insures minimum cost. Expert re-

pairmen have the best equipment at their disposal. Standards of workmanship and test requirements are as rigid as original manufacture. No waiting for your own valves to be repaired—we make immediate shipment from stock of reconditioned devices.

**WESTINGHOUSE  
AIR BRAKE COMPANY**  
*General Office and Works  
Wilmerding Pennsylvania*



**S**AVE from 100% to 600% on the initial investment by equipping your locomotives with SIGNAL FOAM-METERS

Positive control of the foaming tendency of boilers is now possible through the use of a SIGNAL FOAM-METER. Cost of application is low, and extensive service tests have proved maintenance cost to be negligible.

### The SIGNAL FOAM-METER—

Insures clean "dry" steam, reducing cylinder and valve wear.

Saves fuel and water by eliminating the over-blowing of boilers required to "play-safe," when guessing at blowing off requirements.

Eliminates clogging of superheater units and throttle incrustation.

Permits quick turning of power at terminals, because boiler water requires no attention.

Permits running locomotives thirty days between washouts and water changes (provided water is correctly treated to prevent scale formation), at the same time producing cleaner boilers, reducing severe metal stresses incidental with temperature changes and effecting other obvious advantages and economies.

Permits Full chemical treatment of feed waters for complete scale prevention.

Equally as essential on all power plant and marine boilers

Write for Bulletin No. 323.

**ELECTRO-CHEMICAL ENGINEERING CORPORATION**  
1358 NORTH KOSTNER AVENUE • CHICAGO, U. S. A.  
SUBSIDIARY OF THE PYLE-NATIONAL COMPANY



# As In the Past

## Continue To Use PILOT

### Semi-Metallic and Fibrous Packings



Semi-Metallic "V" Pilot  
Booster Ball Joint  
Packing.



Semi-Metallic "V" Pilot  
Throttle Packing.



Semi-Metallic "V" Pilot  
Air Pump Packing.



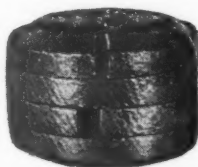
Semi-Metallic "V" Pilot  
Steam Hammer Pack-  
ing.



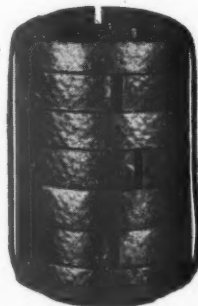
Fibrous Pilot Cabcock  
Packing.



Fibrous Pilot Booster  
Ball Joint Packing.



Fibrous Pilot Air Pump  
Packing.



Fibrous Pilot Throttle  
Packing.

Genuine "V" Pilot *Semi-Metallic* Packing. Presents an all-metal bearing surface to the rod. Assures long packing life because its structure is rugged and durable, steam . . . air . . . and water tight. Furnished in *sets* or in *spiral form*, handily boxed, for quick application to:

Air Pumps	Booster Ball Joints
Throttle Stems	Elesco Feedwater Pumps
Power Reverse Gears	Locomotive Valve Stems
Stokers	Worthington Feedwater Pumps
Steam Hammers And Other Stationary Machinery	

. . .

*Fibrous* Pilot Packing. Made of high-grade crude asbestos and high-grade steam-resisting compound, and incorporating a resilient rubber core of the same high quality. Gives exceptionally good packing service because it contains inherent packing qualities which far exceed those of ordinary fibrous packings. Furnished in *sets* or in *spiral form*, handily boxed, for quick application to:

Air Pumps	Worthington Feedwater Pumps
Booster Ball Joints	Booster Ball Joint Filler Rings
Power Reverse Gears	Locomotive Feedwater Pumps
Steam Hammers	Throttle Stems
Slip Joints	Cabcocks

. . . And All Stationary Machinery

. . .

For many years, PILOT Packings have been satisfying railroad requirements. They will always give the same long life which helps eliminate frequent packing replacements . . . the same dependable service which helps reduce packing maintenance costs. **CONTINUE to USE only Pilot Brand Packings.**

#### Other PILOT BRAND Quality Products:

Compressed Sheet Packing  
Asbestos Listing  
Man Hole and Hand Hole Asbestos Gaskets  
Brake Lining  
Expansion Tube Cleaners  
Auxiliary Reservoir Tube Cleaners  
Combination Front End Tape

## PILOT PACKING CO., INC.

Joseph Sinkler, General Manager

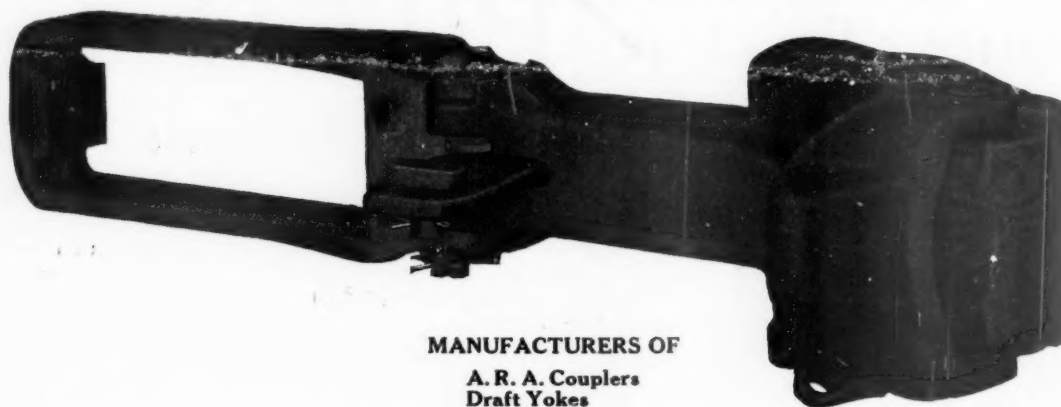
PEOPLES GAS BUILDING, CHICAGO

One Water Street  
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San Francisco

## A. R. A. ALTERNATE STANDARD

Vertical Cast Steel Yoke and Type "E" Swivel Shank Coupler



### MANUFACTURERS OF

A. R. A. Couplers  
Draft Yokes  
Car Castings  
Truck Frames  
Truck Bolsters  
Dalman Trucks  
Q.W.C. Trucks

Six-Wheel Trucks  
for  
Freight Cars and Tenders

Write for our Bulletin No. 24

THE BUCKEYE STEEL CASTINGS CO.

Columbus, Ohio

# CAMEL

Freight Car  
Door Fixtures

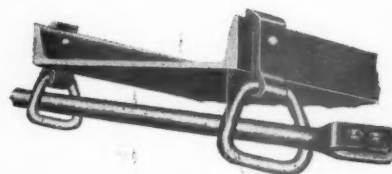
# YOUNGSTOWN

Corrugated Steel  
Freight Car Doors

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CHICAGO, ILLINOIS

## THE "BUFFALO" BOTTOM ROD SUPPORT

MEETING A.R.A. REQUIREMENTS.  
LOOP HELD BY FRICTION ELIMINATING VIBRATION.  
OBSTRUCTIONS SWING IT CLEAR WITHOUT DAMAGE.  
NO BENDING OR BINDING OF BOTTOM ROD.  
PERMITTING FREE MOVEMENT OF BRAKE PARTS.  
FOLDS UP FOR EASY REMOVAL OF CHANNEL.  
MADE TO FIT ANY SIZE CHANNEL.  
WHEN ONCE APPLIED IT IS PERMANENT.



**BUFFALO BRAKE BEAM COMPANY**

NEW YORK

BUFFALO

HAMILTON, ONT.

## HELD UP?



● Have maintenance costs got "the drop" on you? Are you "held up" by excessive painting

costs? Today when every railroad executive is searching for economies, obsolete, inefficient spray-painting equipment is too dangerous to tolerate. It may be costing you more than the small investment necessary to replace it with modern, efficient, dependable DeVilbiss Equipment.

Your near-by DeVilbiss representative is a trained specialist in spray-painting. Call him in and ask him to look at your spray-painting equipment. You will be under no obligation and he may be able, from his wide knowledge and extensive experience, to suggest many valuable economies. DeVilbiss Equipment can do a wide range of work from finishing seat brackets to passenger coaches, from painting boundary markers to bridges, and do it better, faster and cheaper. Call in the local DeVilbiss representative today. Or write.

# DeVilbiss

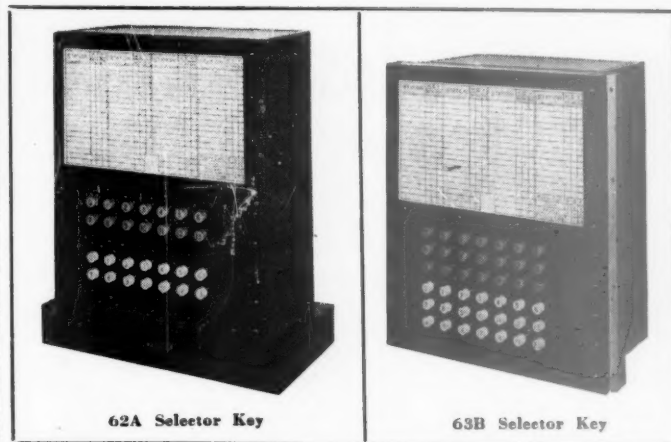
THE DEVILBISS COMPANY • TOLEDO • OHIO

New York Philadelphia Cleveland Detroit Chicago  
St. Louis Los Angeles San Francisco  
Windsor, Ontario

Direct sales and service representatives available everywhere

● The wide and comprehensive experience of DeVilbiss engineers in designing special automatic and semi-automatic equipment is available to meet any new and unusual finishing requirements on your road.

## New Developments in Telephone Train Dispatching



### \*1 Improved COMPACT selector key

The compactness, ease of operation, and simplified maintenance of these new Western Electric motor-driven Selector Keys will appeal to train dispatchers everywhere as an outstanding development in calling equipment.

The small size of the key—12½ inches high, 10¼ inches wide, and 6½ inches deep—should prove particularly valuable in crowded dispatching rooms. Seventy-eight or two hundred forty-one different selectors may be called, depending on the capacity of the key.

Instead of using a separate key to call each selector, as in the past, every selector in the new unit may be called by pressing simple combinations of two keys on the face of the cabinet. Large numbers of selectors are thus made available in the same space. Operation is simple and quick.

The key is made in two types, suitable for mounting either on a desk or in a PBX Switchboard. Each type may be had in two capacities.

The high quality of this apparatus is indicated by the reputation of the maker, Western Electric. In addition, the flexibility, simple maintenance, and compactness of the new Selector Key (all parts of the mechanism are contained within the housing) should make it especially desirable for railroad use.

For further information on Western Electric Selector Keys, or on any other Western Electric Train Dispatching equipment, write the distributor, the Graybar Electric Company.

## Graybar

OFFICES IN 76 PRINCIPAL CITIES  
EXECUTIVE OFFICES: GRAYBAR  
BUILDING, NEW YORK, N. Y.

\* Note: This is one of a series of advertisements dealing with the latest developments in telephone train dispatching. Watch for subsequent advertisements. Or, better yet, send your name to be put on the mailing list for the series.





**SPECIAL BLOWER**  
valve with outside screw  
and yoke . . . Standard or  
triple pitch stem threads  
for regular action or quick  
opening.

## For Economy

● Use **REPLATE** and **PERFECTION**  
Valves, Drain Cocks and Gage Cocks.  
Specially designed for Railroad Serv-  
ice. 150 and 300 lbs. saturated steam  
pressures, also for superheat up to  
750° total temperature ● ● ●

**CENTRAL VALVE MFG. CO.**

231 East 95th St., Chicago  
Eastern Office—111 Broadway, New York City

## CREOSOTED ★ ★ Ties ★ Poles ★ Posts Lumber ★ Timbers Piling

Preservative Treatment  
by any  
Standard Process  
using  
any Standard  
Preservative

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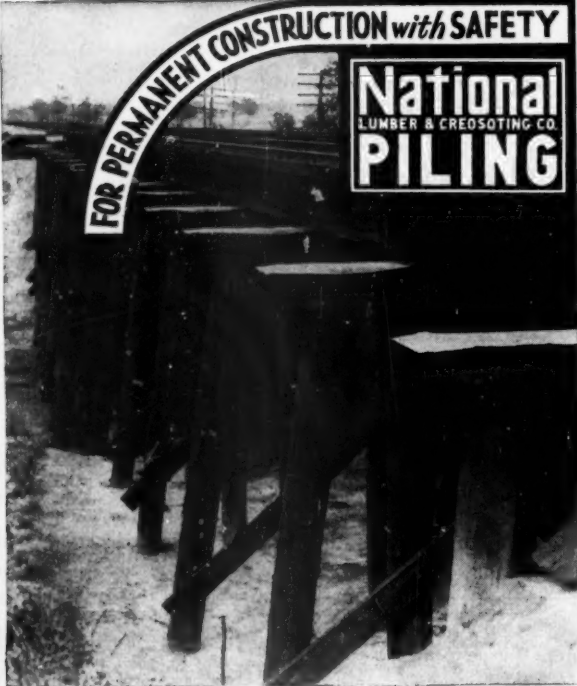
### TREATING PLANTS

Nashua, N. H.  
Newport, Del.  
Adelaide, Pa.  
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Hagerstown, Md.

**CENTURY WOOD PRESERVING CO.**

FOR PERMANENT CONSTRUCTION with SAFETY

**National**  
LUMBER & CREOSOTING CO.  
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FOR COMPLETE INFORMATION AND PRICES ADDRESS

**National Lumber & Creosoting Company**

GENERAL OFFICES: TEXARKANA, ARK.-TEX.

SALES OFFICES  
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Pineau (P. O. Co. Park, Co.  
Sulphur, Colo.  
Houston, Tex.  
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Superior, Wis.

**KERITE**

Out of the experienced  
past, into the exacting  
present, KERITE wires  
and cables, through  
three-quarters of a century  
of successful service, con-  
tinue as the standard by  
which engineering judgment  
measures insulating value.



**THE KERITE INSULATED WIRE & CABLE COMPANY, INC.**  
NEW YORK CHICAGO SAN FRANCISCO

## CAR HEATING

Full 2-inch  
Steam area

2-inch End Valves

No steam-hose  
Renewals

2-inch Metallic  
Conduits

Low  
Maintenance

2-inch  
Couplers



**VAPOR CAR HEATING CO., Inc.**  
Railway Exchange Chicago

## AMERICAN BRIDGE COMPANY

Subsidiary of United States Steel Corporation

**FABRICATED STEEL STRUCTURES**  
**BRIDGES — BUILDINGS**  
**BARGES - TURNTABLES - FURNACES - TOWERS**

General Office: Pittsburgh, Pa. — Offices In The Larger Cities

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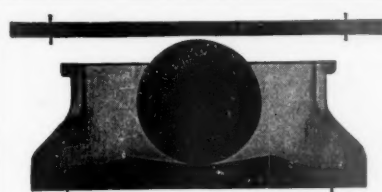
COLUMBIA STEEL CO., SAN FRANCISCO

EXPORT DISTRIBUTOR:

U. S. STEEL PRODUCTS CO., NEW YORK



Hollow Iron Bars up to 14 ft. long—Solid to 18 ft. Hollow or solid Stays, plain, headed, or headed and threaded.



### STUCKI SIDE BEARINGS

Manufactured by  
**A. Stucki Co.**  
Oliver Bldg., Pittsburgh, Pa.  
Canadian Representative:  
The Holden Co., Ltd.,  
Montreal, Can.

**UNARCO**  
Asbestos and Rubber  
Packings for Railroad  
Use. Asbestos Insu-  
lating Materials  
**UNION ASBESTOS & RUBBER CO.**  
310 South Michigan Ave. Chicago, Ill.

## BARBER LATERAL - MOTION DEVICE

1,300,000 cars equipped

**ROLLER SIDE-BEARINGS**

**STANDARD CAR TRUCK CO.**

McCORMICK BUILDING

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## PROFESSIONAL DIRECTORY

**JOHN E. MUHLFELD**

**TRANSPORTATION  
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25 Broad Street, New York

**Robert W. Hunt Company**  
**ENGINEERS**

Inspection—Tests—Consultation  
All Railway Equipment, Structures  
and Materials  
General Office:  
22nd Floor Insurance Exchange  
CHICAGO

Offices in all principal cities

## GET TOGETHER DEPARTMENT

Non-Display "Employment" Ads five cents a word. Count address in figuring cost. Box number requires ten words. All other classified Ads \$4.00 an inch (1" x 1 1/2") an insertion. Payable in advance. Railway Age, 30 Church St., New York, N. Y.

### POSITION OPEN

**I**F You are open to overtures for new connection, and qualified for a salary between \$2,500 and \$25,000, your response to this announcement is invited. The undersigned provides a thoroughly organized service of recognized standing and reputation, through which preliminaries are negotiated confidentially for positions of the calibre indicated. The procedure is individualized to each client's personal requirements; your identity covered and present position protected. Established twenty-two years. Send only name and address for details. R. W. Bixby, Inc., 102 Downtown Building, Buffalo, New York.

### POSITION OPEN

**M**ASTER MECHANIC—inventive, resourceful, experienced in Steam, Diesel and Electric railway motive power and equipment maintenance, construction and design; desires connection with short line property, with opportunity for purchasing interest in same. Address Box 870, RAILWAY AGE, 30 Church St., New York City.

### EDUCATIONAL

**T**HE Railway Educational Bureau, Omaha, Neb., offers a distinctive educational service for Supervisors and other employees. Write for FREE Special Bulletin.

## TRAILS

New and Relaying — Frogs — Tie Plates — Angle Bars—Cars of all types including Tank Cars, Hart Cars, Flat Cars, Box Cars—Railway Equipment—Used Car Parts—Steel Sheet Piling, both new and used.

**HYMAN-MICHAELS COMPANY**

New York  
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Seattle  
St. Louis

20 No. Wacker Drive Bldg.  
**CHICAGO**  
Paris, France

Pittsburgh  
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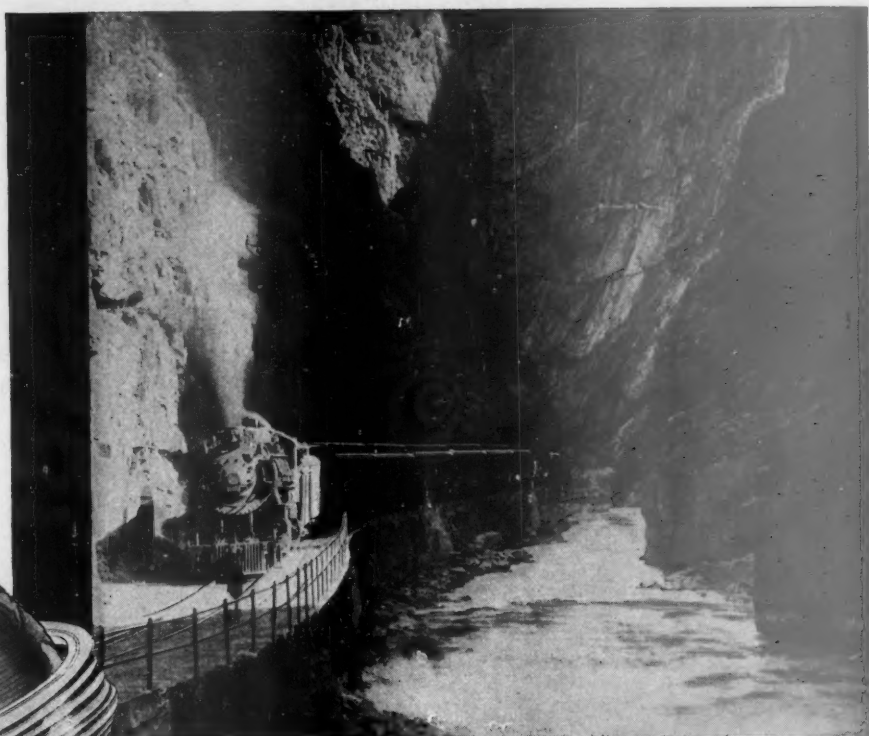
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## 300,000 MILES before overhauling

ON the Mountain type locomotives of the Denver & Rio Grande Western the Standard Type "B" Stokers started service more than three years ago.

These stokers were recently overhauled for the first time since the locomotives were placed in service and after firing for approximately 300,000 miles.

During this period these stokers made an enviable record for trouble-free service, economy of operation and dependability of performance.

In every section of the country, on locomotives in every class of service, Standard Stokers are demonstrating their reliability of performance and economy of operation.

*"There is real economy in Stoker Firing."*

**THE STANDARD STOKER COMPANY**

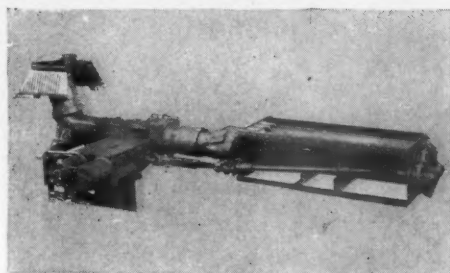
Incorporated

NEW YORK

CHICAGO

ERIE

TYPE "B" STOKER



# Money . . . Power

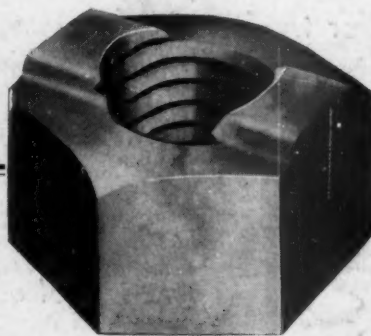
A small amount of money insures a large amount of power. \$44.39 was the cost of equipping every bolt in one of the large, modern, locomotives with Grip Nuts, insuring the holding of

every part in perfect and close adjustment against service shocks and vibration. After 90,000 miles every part was found tight and in place. Not a nut was loosened. Minimum costs with quality.

## Grip Nut Company

5917 S. Western Ave.

Chicago, Ill.



---

25 Years of GRIP NUT SERVICE

